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ORIGINAL ARTICLES.

THE VALUE OF LUMBAR PUNCTURE: WITH PARTICULAR REFERENCE TO THE DIAGNOSIS OF TUBERCULOUS MENINGITIS.¹

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In order to study the pathological changes which occur in the cerebrospinal fluid in disease of the brain and spinal cord, it is necessary to have a clear conception of the character of this fluid in normal healthy individuals.

Since Quincke, in 1891, first published his method of performing lumbar puncture, our knowledge of the subject has enormously increased. At that time it was advocated principally as a therapeutic procedure, while now its broadest field is that of diagnosis. Then it was rarely practised, but to-day it is resorted to as frequently and fearlessly as the puncture of the chest in suspected empyema. Its therapeutic value, both as a palliative and curative measure, will not be entered into here.

The method of procedure as advised by Quincke, and to this day practised with but slight modifications, is too familiar to need repetition, the only point which might be emphasized being its absolute harmlessness when done aseptically, and the caution to stop the flow of fluid when the pressure has reached 20-25 mm. of mercury. This, according to Pfaundler, is the normal subarachnoid pressure in the sitting position, about one-half of which disappears when the patient lies down. In case of tumor of the brain, particularly of the cerebellum, the procedure is not without risk, several sudden deaths having been reported after withdrawal of comparatively small amounts of fluid.

The amount of cerebrospinal fluid in normal individuals varies, but the consensus of opinion is that it is never very large, usually measuring less than 10 c.c. Under pathological conditions, however, it may be increased, even up to several hundred cubic centimeters.

The normal fluid is always absolutely colorless. This, as can be seen by reference to Table I, is also true for cases of tumor of the brain or spinal cord, brain abscess, hydrocephalus, tabs, auto-intoxication, meningeal irritation, etc.,—in fact, for all fluids withdrawn in cases not due to inflammation of the meninges. In tuberculous meningitis, while at first glance the fluid may appear to be colorless, on comparing it with a tube of distilled water, as recommended by

Wentworth, it is usually seen to be slightly opalescent. Berthheim and Moser even found it necessary at times to gently shake the fluid while examining by reflected light, to determine the cloudiness. The depth of color depends upon the number of cellular elements present. Purulent meningitis may give a yellowish fluid, while hemorrhages into the ventricles, trauma to the head or spine, sinus thrombosis, or puncture of a blood-vessel by the trocar, may give a bloody fluid. If the blood has remained in the spinal canal for any length of time, it may even be distinctly brown in color on withdrawal.

In reaction the fluid is faintly alkaline both in health and disease, the amount of alkalinity varying between 0.3 and 0.5 to phenolphthalein. In meningococcus cases, if the fluid be allowed to stand at room temperature for several days, the growth of the meningococcus may make the reaction faintly acid.

Regarding the specific gravity, authorities are well agreed that it usually ranges from 1.001 to 1.009.

The question as to the formation of a fibrin net is of considerable diagnostic importance. In cases of tuberculous and purulent meningitis it is seldom absent after standing six to twelve hours in the ice-box, while in cases of tumor or abscess of the brain, sinus thrombosis, hydrocephalus, meningeal irritation, etc., it never forms even after many days. Wentworth even goes so far as to state that the slightest cloudiness of the fluid, with the formation of a fibrin net, is pathognomonic of an inflammatory exudation in the meninges, and is never absent in cases of meningitis.

Albumin is a normal ingredient of the cerebrospinal fluid, being present in amounts varying from 0.2 to 1.0 parts in 1,000. In tuberculous fluids it is somewhat increased, while in purulent meningitis cases, it is considerably above the normal. Heller's contact ring test, as used for urines, is a quick and reliable method of estimating the comparative amount of albumin present. In healthy persons, and in such cases as are tabulated in Table I, we get a very faint or no ring. Gerhardt finds the amount of albumin increased, not only in inflammatory conditions, but also in cases of hydrocephalus, tumor, cerebral lues, and paralysis. The writer has at times failed to confirm this statement. It is important that no blood be present if the test is to be of any value.

With reference to the presence of sugar we can do no better than quote the conclusions reached by Comba:

"I. That in the cerebrospinal fluid drawn during life from a healthy person, there constantly

¹ The conclusions reached in this paper are based on the examination of 465 cerebrospinal fluids received in the laboratory from the various services of the hospital, since August, 1902, at which time the writer entered upon his duties.

exists a glucose-like reducing substance. The average quantity is 4 to 5 centigrams to 100 c.c.

"II. In tuberculous meningitis the glucose is found in small amounts at the onset, but is absent toward the end.

"III. In purulent meningitis glucose is always absent.

TABLE I.—NON-INFLAMMATORY FLUIDS.

No.	Color	Sugar	Cytology		Clinical Diagnosis
			Mono-nuclear leucocy.	Poly-nuclear leucocy.	
1	clear	neg.	very few	very few	Tumor of brain
2	clear	neg.	very few	very few	Tumor of brain
3	bloody	neg.	very few	very few	Tumor of brain
4	clear	reduction	very few	very few	Tumor of brain
5	clear	reduction	none	none	Tumor of brain
6	clear	reduction	very few	very few	Tumor of brain
7	sl. bloody	neg.	few	few	Brain abscess
8	clear	neg.	none	none	Brain abscess
9	sl. bloody	neg.	blood	blood	Brain abscess
10	clear	neg.	none	none	Tabes
11	clear	reduction	80%	80%	Pseudotabes
12	clear	reduction	very few	none	Tabes
13	clear	neg.	none	none	Hemiplegia
14	clear	reduction	very few	none	Amaurotic family idiot
15	bloody	neg.	blood	blood	Inf. cereb. palsy
16	bloody	reduction	blood	blood	Multiple neuritis
17	bloody	....	blood	blood	Meningeal irritation
18	sl. bloody	....	blood	blood	Embolism
19	bloody	....	blood	blood	Embolism
20	clear	neg.	very few	none	Cerebellar hemorrhage
21	clear	reduction	35%	65%	Cerebellar hemorrhage
22	clear	reduction	many	few	Insolation
23	clear	neg.	83%	17%	Hydrocephalous
24	clear	neg.	85%	15%	Hydrocephalous
25	bloody	....	moderate	few	Hydrocephalous
26	sl. bloody	neg.	66%	34%	Hydrocephalous
27	clear	neg.	70%	30%	Hydrocephalous
28	clear	neg.	60%	40%	Hydrocephalous
29	clear	reduction	very few	very few	Hydrocephalous
30	bloody	reduction	very few	very few	Hydrocephalous
31	sl. bloody	neg.	blood	blood	Hydrocephalous
32	sl. bloody	neg.	few	few	Pachymeningitis chronica
33	clear	reduction	few	moderate	Pachymeningitis chronica
34	clear	neg.	none	none	Pneumonia
35	clear	neg.	none	none	Pneumonia
36	bloody	....	blood	blood	Pneumonia
37	clear	neg.	few	moderate	Pneumonia
38	clear	neg.	....	....	Pneumonia
39	clear	reduction	none	none	Pneumonia
40	clear	reduction	very few	very few	Pneumonia
41	clear	neg.	very few	very few	Pneumonia
42	clear	reduction	none	blood	Influenza
43	clear	reduction	very few	very few	Typhoid
44	clear	reduction	none	none	Typhoid
45	bloody	reduction	few	few	Typhoid
46	clear	neg.	blood	blood	Enteritis
47	clear	neg.	few	few	Colitis
48	clear	neg.	few	few	Auto-intoxication
49	clear	....	none	none	Auto-intoxication
50	clear	neg.	few	none	Tetanus
51	bloody	neg.	blood	blood	Septis
52	clear	reduction	very few	very few	Uremia
53	clear	reduction	few	very few	Acromegaly
54	bloody	reduction	moderate	blood	Trauma to head
55	clear	reduction	reduction	few	Trauma to head

The diagnoses given are those in the hospital "Admission and Discharge Book."

Fluids Nos. 33 and 36 showed many endothelial cells.

The quantity of albumin is based upon the depth of the contact ring test.

In all of these patients microscopical and cultural examination yielded negative results. The amount of albumin varied from 4 to 6 mm.; in Nos. 3, 17, 28, 33, 37, 40 and 45 it was regular.

"IV. The diminution and disappearance of glucose in the cerebrospinal fluid are probably due more to the glycolytic action of the nucleoproteids of the leucocytes than to that of the bacteria contained in the exudate.

"V. The proportion of glucose is less than that of the blood, which tends to prove that it is a product of secretion, rather than of transudation."

The writer fully concurs in these statements with the exception that he has never been able to demonstrate the presence of glucose at any stage of tuberculous meningitis. See Table II.

This glucose-like substance as found in normal cerebrospinal fluids, is capable of reducing Fehling's copper solution, but leaves Nylander's solution unaffected. It is incapable of undergoing fermentation and is ordinarily regarded as pyrocatechin. Its absence in tuberculous and

TABLE II.—TUBERCULOUS FLUIDS.

No.	Microscopic	Cytology		Days Ante-mortem.
		Mono-nuclear Leucocytes	Poly-nuclear Lymphocytes	
1	tubercle bacilli	+++	+	4
2	tubercle bacilli	+++	+	1
3	negative	+++	+	6
4	tubercle bacilli	+++	+	3
5	negative	+++	+	5
6	tubercle bacilli	+++	+	1
7	negative	+++	+	11
8	negative	+++	+	3
9	tubercle bacilli	+++	+	2
10	tubercle bacilli	+++	+	1
11	tubercle bacilli	+++	+	5
12	tubercle bacilli	+++	+	1
13	tubercle bacilli	+++	+	3
14	negative	no fluid	no fluid	3
15	negative	no fluid	no fluid	2
16	tubercle bacilli	+++	+	8
17	negative	+++	+	6
18	tubercle bacilli	+++	+	2
19	tubercle bacilli	97% blood	3% blood	1
20	tubercle bacilli	97% blood	3% blood	10
21	tubercle bacilli	70% blood	30% blood	2
22	negative	45% blood	55% blood	3
23	negative	+++	+	1
24	tubercle bacilli	85%	15%	2
25	tubercle bacilli	+++	+	1
26	tubercle bacilli	+++	+	2
27	tubercle bacilli	65%	35%	7
28	tubercle bacilli	60%	40%	9
29	negative	40%	60%	8
30	tubercle bacilli	35%	65%	1
31	tubercle bacilli	50%	50%	1
32	tubercle bacilli	85%	15%	1
33	tubercle bacilli	85%	15%	2
34	tubercle bacilli	80%	20%	1
35	tubercle bacilli	90%	10%	2
36	tubercle bacilli	90%	10%	2
37	tubercle bacilli	85%	15%	1
38	tubercle bacilli	75%	25%	7
39	tubercle bacilli	90%	10%	2
40	tubercle bacilli	70%	30%	8

In this series the cultural results were negative; the amount of albumin varied from three to six mm.

The crosses represent the comparative number of mononuclear and polynuclear leucocytes.

The two negative cases were proved to be tuberculous by guinea-pig inoculation. One of these cases (No. 14) could justifiably be disregarded because the amount of fluid received at the laboratory was too small (4 c.c. and 1 c.c. respectively) and too bloody to be of much use.

purulent meningitis makes it an important diagnostic help.

Of more diagnostic value than any of the foregoing is the careful cytological examination of the fluid. For this purpose the centrifuge should be used and spreads made from the sediment. Here again the presence of blood must be carefully avoided, since by its presence an artificial polynuclear leucocytosis is caused, which will make the result unreliable. A lack

of attention to this point may account for the many discrepancies found in the literature.

Unfortunately we can formulate only general rules as to the significance of the cytological findings. At one time it was thought that the presence of many mononuclear leucocytes pointed positively to a tuberculous meningitis, and that the predominance of polynuclear leucocytes made the diagnosis that of a purulent meningitis. Thus Widal, to whom we owe much for the researches along this line, shows the relationship existing between the cytological picture and the etiology of meningitis, by reporting three tuberculous cases, all of which showed almost exclusively lymphocytes. Pfaundler makes the statement that "mononuclear leucocytes only occur in large numbers in tuberculous meningitis cases." But on looking over the further work done on this subject, we must regard these positive statements as erroneous, for acute tuberculous meningitis may show an increase of the polynuclear leucocytes, and a chronic purulent meningitis may show the reverse. Marcon and Mutzner report an interesting case, in which the cerebrospinal fluid contained mainly polynuclear leucocytes, and yet the autopsy revealed a well-advanced tuberculous meningitis. As a general rule, however, it is true that a mononuclear leucocytosis goes with a tuberculous, and a polynuclear leucocytosis with a purulent meningitis. In the 51 fluids from cases of tuberculous meningitis tabulated in Table II, only three fluids proved exceptions to this general rule.

Nissl also finds a lymphocytosis in cases of syphilitic paraplegia. In 37 cases examined, he found it present in every case but one. Gerhardt claims its presence also in cases of lues of the brain, and in tabes dorsalis. The number of fluids examined by the writer from such cases is too few to warrant any conclusions. Endothelial cells have occasionally been found in cases of tumor of the brain.

-Cryoscopy has been found of no value.

The bacteriological findings are of paramount importance, giving us, when positive, an absolute diagnosis of the etiology of the disease. When negative we can draw no conclusions. Thus Stadelmann says: "Positive conclusions can only be drawn from positive, but never from negative results." The number of different organisms described as having caused meningitis is legion. Thus the *Staphylococcus albus* and *Staphylococcus aureus*, the streptococcus, the pneumococcus, the meningococcus, the typhoid bacillus, the *Bacterium coli*, the influenza bacillus, the bacillus of Friedländer, the bacilli of glanders and plague, the tubercle bacillus and even the *Micrococcus tetragenus* and *Actinomyces bovis*, have been credited as being the etiological factor of the disease. To this list can also be added the cases mentioned by Libman and Celler, in which the pseudo-influenza bacillus, the *Bacillus pyocyaneus*, and the *Bacillus proteus vulgaris* were isolated during life.

In the series of cases here reported the *Diplococcus intracellularis meningitidis* as first described by Weichselbaum in 1887, was the organism most often found, appearing in 64 per cent. of the cases due to inflammation of the meninges. For a description of its cultural characteristics I would refer to the paper of Libman and Celler.

The tubercle bacillus was the second in frequency. In the 40 cases examined, tubercle bacilli was found in 38 (see Table II) making a percentage of 95. This remarkable high percentage of positive results, we believe is due purely to careful technic and to patience in looking for the bacilli. In more than one case it was necessary to search for several hours before the tubercle bacillus was found.

Technic and patience have much to do with the diverse results reported by different authors. Thus Monti, who examined 35 cerebrospinal fluids withdrawn from 15 typical cases of tuberculous meningitis, failed to find the tubercle bacillus in any case, and therefore concludes that lumbar puncture furnishes no help in the diagnosis of tuberculous meningitis.

Other authors have also reported negative results, but the number of fluids examined was usually small. Thus Felsenthal, who examined one case of tuberculous meningitis, and Senator, who examined two, failed to find the tubercle bacillus. Ewald never succeeded in establishing the diagnosis in any of his cases, and Heubner also had negative results in the six or seven fluids examined. Kopp reports one positive finding in the three cases examined, while Stadelmann, who examined 14 fluids, found tubercle bacilli three times.

As the number of fluids examined becomes greater, we notice a corresponding increase in the percentage of positive results, which means that with more experience comes better technic. Thus Fürbringer found the tubercle bacillus in 27 of the 37 cases examined (73 per cent.), and Bernheim and Moser reach the same percentage by having 44 positive results in 60 cases (73 per cent.) Slawyk and Manicattide found tubercle bacilli 16 times in 19 fluids (84 per cent.), while Langer, who examined 22 fluids, had 18 positive results (85 per cent.) Pfaundler succeeded in demonstrating the tubercle bacillus in spreads, in 9 out of his 10 cases (90 per cent.)

Several methods have been advocated to make the search easier and more successful. Lenhartz employed a small piece of absorbent cotton, which he allowed to sink slowly to the bottom of the fluid, hoping thereby to entangle any tubercle bacilli present. He would then lift it out with a platinum loop, tap it over a cover-glass, and stain for the bacilli. Slawyk and Manicattide used the fibrin net if present, and spread this on a cover-glass for use. If no fibrin net formed they centrifuged the fluid and employed the last few drops.

The author's technic in handling cerebrospinal

TABLE III.—MENINGOCOCCUS CASES.

No.	Albumin	Microscopic	Cytology	
			Mononuclear Leucocytes	Polynuclear Leucocytes
1	4 mm.	negative	+	++++
2	6 mm.	meningococcus	blood	blood
3	bloody	negative	+	++++
4	.....	meningococcus	+	++++
5	4 mm.	meningococcus	+++	+
6	4 mm.	negative	+	+
7	8 mm.	meningococcus	+	+
8	6 mm.	meningococcus	+	+
9	5 mm.	meningococcus	+	+
10	6 mm.	negative	+	+
11	6 mm.	meningococcus	+	+
12	5 mm.	meningococcus	+	+
13	4 mm.	meningococcus	+	+
14	5 mm.	meningococcus	+	+
15	6 mm.	meningococcus	+	+
16	bloody	meningococcus	blood	blood
17	bloody	meningococcus	blood	blood
18	3 mm.	meningococcus	+	+
19	.....	meningococcus	+	+
20	8 mm.	meningococcus	+	+
21	7 mm.	meningococcus	+	+
22	7 mm.	meningococcus	+	+
23	6 mm.	meningococcus	+	+
24	6 mm.	meningococcus	+	+
25	6 mm.	meningococcus	+	+
26	6 mm.	negative	+	+
27	5 mm.	meningococcus	+	+
28	4 mm.	meningococcus	+	+
29	6 mm.	negative	+	+
30	4 mm.	negative	+	+
31	5 mm.	meningococcus	+	+
32	6 mm.	meningococcus	+	+
33	5 mm.	meningococcus	+	+
34	6 mm.	meningococcus	+	+
35	7 mm.	meningococcus	+	+
36	5 mm.	meningococcus	+	+
37	4 mm.	negative	30%	70%
38	6 mm.	meningococcus	10%	90%
39	3 mm.	meningococcus	27%	73%
40	3 mm.	negative	6%	94%
41	7 mm.	meningococcus	15%	85%
42	4 mm.	meningococcus	37%	63%
43	6 mm.	meningococcus	30%	70%
44	6 mm.	meningococcus	28%	72%
45	6 mm.	meningococcus	25%	75%
46	4 mm.	meningococcus	32%	68%
47	6 mm.	meningococcus	5%	95%
48	4 mm.	negative	40%	60%
49	7 mm.	meningococcus	5%	95%
50	4 mm.	negative	40%	60%
51	6 mm.	meningococcus	15%	85%
52	5 mm.	meningococcus	18%	82%
53	6 mm.	meningococcus	2%	98%
54	4 mm.	meningococcus	10%	90%
55	6 mm.	meningococcus	25%	75%
56	4 mm.	negative	Few	90%
57	6 mm.	meningococcus	10%	90%
58	6 mm.	meningococcus	5%	95%
59	5 mm.	meningococcus	5%	95%
60	4 mm.	negative	2%	98%
61	4 mm.	meningococcus	35%	65%
62	4 mm.	meningococcus	15%	85%
63	6 mm.	meningococcus	12%	88%
64	4 mm.	meningococcus	20%	80%
65	5 mm.	meningococcus	5%	95%
66	6 mm.	meningococcus	5%	95%
67	4 mm.	meningococcus	10%	90%
68	4 mm.	meningococcus	25%	75%
69	5 mm.	meningococcus	25%	75%
70	4 mm.	meningococcus	10%	90%
71	5 mm.	meningococcus	5%	95%
72	7 mm.	meningococcus	17%	83%
73	7 mm.	meningococcus	12%	88%
74	6 mm.	meningococcus	2%	98%
75	7 mm.	meningococcus	blood	blood
76	6 mm.	meningococcus	10%	90%
77	7 mm.	meningococcus	2%	98%
78	6 mm.	meningococcus	8%	92%
79	4 mm.	meningococcus	5%	95%
80	3 mm.	meningococcus	5%	95%
81	4 mm.	meningococcus	8%	92%
82	4 mm.	meningococcus	5%	95%
83	4 mm.	meningococcus	3%	97%
84	4 mm.	meningococcus	1%	99%

Sugar negative in all cases except in 16 and 17, where fluid was bloody.

Microscopically there were meningococcus in the cultures in all the cases except Case 6.

fluids is as follows: As soon as the fluid is received at the laboratory, a culture is made of it on serum-agar and serum-bouillon, both with and without glucose. If a web of fibrin has formed, it is pricked out with a sterile platinum loop and spread on an absolutely clean cover-glass until dry. This smear of fibrin acts as a nidus for the sediment obtained by means of the centrifuge. The fluid is then poured into a sterile centrifuge tube and centrifugized for ten minutes. All but the last few drops is then poured off, the centrifuge tube refilled and this process is continued until all the fluid has been thoroughly centrifugized. The centrifuge tube now contains a few drops of fluid holding all the elements thrown down. A platinum loop is introduced and the sediment thoroughly stirred up, scraping the bottom of the tube so as to free any tubercle bacilli which may be adhering to the glass. Then a drop of this fluid is placed on a clean cover-glass for cytodagnosis, and the remainder is poured over the film of fibrin previously prepared, and placed in the thermostat to dry. This concentration of material on one specimen is much to be preferred to the method advised by some authors, notably Pfaunder, who hunts through 10 to 20 spreads from each cerebrospinal fluid. In one or two hours the specimen has thoroughly dried, and after passing it three times through the flame, is stained by the Ziehl-Neelsen method.

The necessity of having absolutely clean cover-glasses for this work is exemplified by a case reported by Fürbringer, in which he found tubercle bacilli in the cerebrospinal fluid and at the post mortem an advanced typhoid fever was discovered. He thinks that possibly the cover-glass used had been previously employed for staining a tuberculous sputum.

The decanted fluid is then tested as to its reaction, specific gravity, presence of albumin, sugar, etc.

It would be manifestly unfair to quote the statistics of different authors on tuberculous fluids without, at the same time, noting at what stage of the disease the lumbar punctures had been made, for the nearer the agonal period the fluid is withdrawn, the higher the percentage of positive results should be. Most of the cases of Slawyk and Manicatide were punctured during the last three days of life, one case, however, showed tubercle bacilli on the seventh, and one on the ninth day before death. Langer's fluids, as a rule, were withdrawn somewhat earlier in the disease, ranging between the first and sixth day before exitus. The writer's cases were as follows:

14 cases showed tubercle bacilli	1 day before death.
10 cases showed tubercle bacilli	2 days before death.
1 case showed tubercle bacilli	3 days before death.
1 case showed tubercle bacilli	4 days before death.
2 cases showed tubercle bacilli	5 days before death.
2 cases showed tubercle bacilli	6 days before death.
2 cases showed tubercle bacilli	7 days before death.
3 cases showed tubercle bacilli	8 days before death.

1 case showed tubercle bacilli 9 days before death.
1 case showed tubercle bacilli 10 days before death.
1 case showed tubercle bacilli 12 days before death.

The possibility of growing the tubercle bacillus in cases where a microscopical examination has proved negative, has been strongly advocated by Langer, who states that in every one of his cases, he succeeded in cultivating the bacillus in the cerebrospinal fluid. By this means he diagnosed 100 per cent. of his cases. Unfortunately, we meet with the same objection here, as we do to the inoculation of the fluid into guinea-pigs—the patient is long dead before the diagnosis is obtainable. For even under the most favorable circumstances, the cultivation of the tubercle bacillus takes four weeks. It is true that this method is easier and cheaper than the use of guinea-pigs, but it is not as sure. Slawyk and Manicattide tried to cultivate the bacillus in all of their 19 positive fluids, and only succeeded in three cases. The writer's experiences along this line are too few to allow of any expression of opinion further than to say that he sees no advantage in cultivation over inoculation, since time is hardly saved thereby.

TABLE IV.—STREPTOCOCCUS CASES.

No.	Albu- min	Microscopic	Culture	Cytology	
				Mono- nuclear Leucocytes	Poly- nuclear Leucocytes
1	4 mm.	streptococcus	streptococcus	+	++++
2	4 mm.	staphylococcus	staphylococcus	+	++++
3	4 mm.	staphylococcus	streptococcus	+	++++
3	4 mm.	streptococcus	streptococcus	+	++++
4	4 mm.	streptococcus	streptococcus	+	++++
4	4 mm.	negative	negative	bloody	++++
5	4 mm.	negative	negative	bloody	++++
6	4 mm.	streptococcus	streptococcus	+	bloody
7	4 mm.	streptococcus	streptococcus	10%	90%
8	3 mm.	streptococcus	streptococcus	11%	89%
9	4 mm.	streptococcus	streptococcus	17%	83%

Sugar negative.

That the subcutaneous or intraperitoneal inoculation of the cerebrospinal fluid into guinea-pigs is absolutely reliable, is accepted by most pathologists, but 5 c.c. or more should be injected, and four to six weeks allowed to elapse before the animal is killed. Marfan reported a case in which he injected less than 4 c.c. with negative result and yet the autopsy showed the presence of a tuberculous meningitis. Our results, even when the amount of fluid sent to the laboratory was so small that we had to content ourselves with the injection of only one or two cubic centimeters, were uniformly good.

TABLE V.—PNEUMOCOCCUS CASES.

No.	Albu- min	Microscopic	Culture	Cytology	
				Mono- nuclear Leucocytes	Poly- nuclear Leucocytes
1	....	pneumococcus	pneumococcus	+++	+++
2	4 mm.	pneumococcus	pneumococcus	+++	95%
3	3 mm.	pneumococcus	pneumococcus	5%	95%

Sugar negative.

One possibility still remains of overcoming the objectionable time-limit in the use of the guinea-pig. It has been suggested that we employ the tuberculin reaction for an early diagnosis. After the animal is injected with the suspected cerebrospinal fluid, and subsequently with tuberculin, will the thermometer give us a clue? This question the writer hopes to investigate in the near future.

As a possible additional help in the diagnosis of tuberculous cerebrospinal meningitis, Donath tried microscopic agglutination tests, using an emulsion of tubercle bacilli, against which he tested the cerebrospinal fluid. He found the agglutinative power very low, none being positive even in dilutions of 1:10, while in a case of epidemic cerebrospinal meningitis, he obtained a partial reaction. His own conclusions are that this method is not reliable.

In connection with the question of agglutination it may be of interest to note the results obtained by the writer in two cases of typhoid fever, in which he tested the cerebrospinal fluid against the Eberth bacillus. Although the blood of both cases showed a positive Widal reaction in dilutions of 1:50, yet the cerebrospinal fluid gave absolutely no reaction even as low as 1:5.

Regarding the prognosis of tuberculous meningitis we must be rather conservative. Until a few years ago it was regarded as absolutely fatal, but in the recent literature we find four rather convincing reports of cases cured. Schaeche, who seems to have overlooked Freyhan's, as well as Henkel's cases, makes the statement as recently as 1901, that no single case of so-called healed tuberculous meningitis, showed tubercle bacilli in the lumbar puncture fluid. He further says that even if a case looks like tuberculous meningitis, and goes on to recovery, we are forced to change our diagnosis to that of serous meningitis, as tuberculous meningitis is always fatal.

Freyhan, who reported the first case of recovery, cannot be questioned as to the correctness of his diagnosis. His patient had typical symptoms of tuberculous meningitis, and tubercle bacilli were found in each of two different lumbar puncture fluids. The patient, after several months, made a perfect recovery. Henkel reported the second case on record in 1900. His patient was a boy ten years old, in whose cerebrospinal fluid tubercle bacilli were found, and yet the case recovered. Barth, in 1902, reported the recovery of a child 2¾ years of age, in whose lumbar puncture fluid tubercle bacilli had been found. Lastly, Gross, in the same year, reported a case in which three lumbar punctures had been made, the first showing tubercle bacilli and the other two being negative, and yet the case went on to recovery. These four are the only apparently authentic non-fatal cases of tuberculous meningitis in the literature. All of the 40 cases referred to in this paper terminated fatally.

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**THE BACTERIAL AND CELLULAR EXAMINATION
 OF THE SPINAL FLUID IN FIFTY CASES
 OF CEREBROSPINAL MENINGITIS.**

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DURING the last eighteen months spinal fluid from 150 cases has been received by us for examination of either the cellular elements or bacteria, or both, contained in these fluids, and from these 150 cases the 50 cases of acute meningitis were taken for presentation.

Remarks concerning the clinical study of the cases are purposely omitted.

Somewhat similar clinical symptoms of meningeal irritation in infectious diseases may be due to the two fundamentally different pathological conditions to be differentiated during life by careful study only of the spinal fluid, viz., meningismus, an irritation probably due to bacterial toxins elaborated in some organ or tissue of the body other than the meninges, as in typhoid and pneumonia, both of which, however, may produce during their course a true meningeal infection, and meningitis with the infectious agent localized in the meninges.

The fluids from meningitis cases fall into two types, the serous fluid from a serous meningitis, of which tuberculous meningitis is the type, and the purulent fluid from a purulent meningitis, caused perhaps by the meningococcus, streptococcus, pneumococcus or other organism. In the study of fluids from cases of acute meningitis

we have to look for and deal with serous and purulent types. The serous type may be overlooked readily if slight changes in color are not noted; and if careful examination of centrifugated specimens and cultures for bacteria are not carried out. The purulent type is readily recognized from the turbidity of the spinal fluid.

The normal spinal fluid obtained by lumbar puncture is absolutely clear and colorless, unless clouded and colored by hemorrhage from traumatism during puncture; free from coagulum and sediment; contains a few to a dozen small mononuclear cells after thorough centrifugation and searching through several preparations from the apparently clear fluid at the bottom of one centrifuge tube, and is free from bacteria, excepting contamination. The presence of *Micrococcus albus* in cultures we have always considered due to skin contamination and have not considered it in our results.

The amount of fluid withdrawn varied from 5 to 60 c.c. The fluids were examined as soon after puncture as possible, usually within six hours, yet when collected in sterile tubes with cotton plugs some specimens twenty-four hours old and three forty-eight hours old were fit for a satisfactory examination. It is well to allow the clear fluids to stand for five or six hours after puncture in order to allow time for the separation of coagulum, which will occur in some specimens, particularly if tuberculous. For the study of cells and cultures of bacteria the freshly drawn fluids are preferable.

The fluids were examined as to (1) macroscopic characteristics—clearness, coagulum, color or absence of color, sediment; (2) as to cellular content, relative number of cells, types of cells, relative proportions of different types of cells (cytodiagnosis); (3) and as to bacterial content.

After thorough study of literature and of several fluids, these three phases of examination were selected as of most importance for diagnostic and practical points of view, the clinical study being neglected, with exception of qualitative tests for cholin, the results of which will be reported later with the remainder of the 150 fluids examined for cholin.

Macroscopic Examination.—For a satisfactory macroscopic, cellular and bacteriological examination it is necessary to collect the fluid in at least two (or three) sterile tubes, preferably centrifuge tubes, so that preparations from the sediment for bacterial cultures and subsequent study of cells may be made readily without exposure to contamination from unnecessary manipulation; and the collecting of the fluid in two or three tubes satisfies one at once in regard to slight accidental hemorrhage from traumatism from the lumbar puncture. If the bleeding is pathologic, the second and third tubes will show a blood-color and cloudiness similar to the first tube. With extensive bleeding, which may occur from accident (e.g., from a fall) to a meningitis

¹ Read before the Fifth District Branch of the New York State Medical Association, May 2, 1905.

case, the characteristics of the pathological fluid may be obscured and the meningeal condition diagnosed only after the determination of the ratio of red and white cells and the differential count of the white cells and the finding of bacteria, as shown by one case reported under cases due to the meningococcus.

In addition to the 50 cases of cerebrospinal meningitis, five cases of tuberculous meningitis are included in the report.

With no exception, the 50 acute non-tuberculous infections produced a turbid fluid, the turbidity ranging from a faint opalescence, due to bacteria in one fluid, to a fine or coarse, flaky suspension of fibrin flakes and leucocytes in the majority of the fluids. The five tuberculous fluids were clear, without the faintest opalescence or cloudiness, save a delicate veil-like coagulum (Mya's "cobweb coagulum"), extending from the surface to the bottom of the fluid.

This "veil-coagulum" is of importance in these tuberculous fluids, for during centrifugation it carries down some of the organisms and cells in suspension, and after centrifugation this coagulum is the part of the sediment in which one should search for the tubercle bacillus. If no coagulum is found in suspected tuberculous fluids, the albumin bodies, which are increased in this condition, may be thrown out by heating carefully, after acidulating with one or two drops of 10 per cent. acetic acid, so that during centrifugation the precipitated albumin will carry down the bacteria. Such a method, however, does not suffice for a study of cellular elements. These two simple methods do away with the necessity for employing Jousset's or any other similar method of inocopy with their artificial precipitation and subsequent digestion of the precipitated material.

The color of the fluids was noted after centrifugating and decanting off the supernatant clear fluid into a test-tube, or a Nessler tube, in order that the observation for color might be made through a long column of fluid, for in this manner only is it possible at times to note the acquisition of color, pale yellow to a deep straw-yellow, which occurs in the tuberculous cases.

Of the spinal fluids from the 50 non-tuberculous cases all contained a suspension of leucocytes and bacteria and fibrin flakes immediately after withdrawal, and a sediment upon standing or after centrifugation. The tuberculous cases rarely show a sediment other than the veil-coagulum, which is thrown down on centrifugation.

Cytodiagnosis.—The cellular content was examined after the method described in the *Medical Record* for January 23, 1904. The total number of red and white cells, and the relative numbers of each were estimated by means of an Ehrlich's eye-piece, the average of 100 fields being taken as a unit for comparison. For differential counting of the white cells two methods have been used: A wet method, in which a drop

of the sediment is mixed with a drop of Löffler's methylene blue on a slide, covered with a cover-glass and examined with a magnification of 500 diameters; and the dry method, in which a drop of sediment on a slide is dried at 36° C. for half an hour, and then stained with Wright's blood stain or a modified Nocht stain, or any other blood stain in solution in methylic alcohol, such as Jenner's, thus avoiding previous, separate fixation of the specimen. There is no apparent advantage in searching for eosinophile and basophile cells, so that, as a rule, we have used the wet method, and for these infectious cases have classified the cells as polynuclears and small mononuclears (lymphocytes).

Bacteriological Examination.—For bacteriological examination, cultures upon glycerin-agar, plain agar, occasionally upon ascitic fluid agar, and in broth, have been prepared from the sediment immediately after centrifugating and decanting off the supernatant fluid, and smears have been prepared and stained by Gram's method and for tubercle bacilli. In the following records under "smears," "meningococci" implies that the organisms were intracellular, and "pneumococci" that capsules were demonstrated. Where cultures were later positive, the records of smears are unimportant.

Of the 55 cases, 42 were due to the meningococcus (*Diplococcus intracellularis meningitidis* of Weichselbaum), and two of these gave on culture the pneumococcus as well as the meningococcus; five were due to the pneumococcus, five to the tubercle bacillus and three to organisms not satisfactorily identified.

The first clinical diagnosis in all these cases was epidemic cerebrospinal meningitis.

Forty-two Cases Due to Meningococcus.—The amount of fluid withdrawn varied from 1 to 20c. c. So far as one may judge from the clinical history the fluid was first examined three to ten days after onset, and in only two cases was it impossible to make a correct bacteriological diagnosis from the fluid at this period of the disease. In one exception the meningococcus was found in the fluid from a second lumbar puncture during the second week, and a diagnosis of meningitis was justified from the cellular content of the fluid obtained during the first week, although at this time the bacteriological diagnosis was obscured by contamination of the fluid. The second exception was a case in which diagnosis was obscured by hemorrhage from accident. The fluids from these forty-two cases were turbid, varying from a fine flocculent translucent cloudiness to a purulent opaqueness. In none of them did a coagulum separate out. The turbidity was due to fibrin flakes, leucocytes and bacteria, and upon standing, a definite thick sediment fell. The supernatant fluid, after centrifugation, was clear and colorless in six specimens, clear and of faint to deep yellow color in six, and definitely blood-tinged in eight, and in 22 cloudy. The cells in 100 fields (the unit mentioned above)

varied as follows: Red cells, from 20 to 1,440 in 100 fields; white cells, from 20 to 84,000 in 100 fields. In the purulent fluids there is no necessity for estimating the cells.

In all the specimens containing more than a microscopic trace of blood, the second and third tubes, whenever a third tube was taken, contained comparatively few red cells when compared to tube 1, and in all of them the ratio of white to red cells was far greater than in normal blood.

Differential counts of white cells always gave a relatively high percentage of polynuclear cells, varying from 68 to 100 per cent. In two out of four cases which recovered, with repeated punctures, the mononuclear cells increased in percentage as the disease approached convalescence, and late in convalescence the percentage of mononuclear was greater than the percentage of polynuclear cells, and in the other two cases this relative mononuclear increase did not occur.

In three fatal cases, with reported puncture, this gradual relative increase in mononuclear cells did not occur. The abundance of exudation as evidenced by this total number of cells and the variation in relative percentages of polynuclear and mononuclear cells bore no relation to the severity of the infection as manifested by clinical symptoms, to the prognosis, or fatality.

In six cases the meningococcus was found in smears only, and in the remaining 36 cases in smears and by culture.

In one case the diagnosis was obscured by extensive hemorrhage. The three collecting tubes contained fresh blood and later a clot, yet the white cells far outnumbered the red cells (whites, 81,200; reds, 1,440; a ratio of one red to 56 whites), and the polynuclear cells predominated (80 per cent.); bacteria were not found. The diagnosis of hemorrhage and meningitis suggested by the cell count was verified at autopsy. Two of these meningococcus cases were infected with the pneumococcus also, and the fluids were similar to those from the pure meningococcus cases. One of these two mixed cases recovered.

Five Cases Due to the Pneumococcus.—The amount of fluid withdrawn varied from 5 to 30 c.c. These fluids were cloudy, tinged yellow in the supernatant portion after centrifugation, and gave an abundant purulent sediment. The white cells varied from 300 to 8,000 in 100 fluids, and the polynuclears predominated, from 94 to 99 per cent. Pneumococci were found in smears and by culture. These fluids differed from those from the meningococcus cases in their bacteriological content only. The five were fatal.

Five Cases Due to the Tubercle Bacillus.—The amount of fluid withdrawn varied from 10 to 60 c.c. In all five cases the fluids were clear, and after standing six or eight hours the delicate coagulum separated out. The color varied from a straw-yellow to a deep yellow. After centri-

fugation, the supernatant fluid was absolutely clear, but still colored, and the coagulum formed a small amount of sediment. A drop of fluid from the bottom of the centrifuge tube contained a few white cells, varying from 10 to 166 in 100 fields, and differential counts gave a predominance of small mononuclears, varying from 68 to 100 per cent. In three cases tubercle bacilli were readily found in the coagulum after centrifugation; in the fourth case, with only 10 white cells in 100 fields and 100 per cent. lymphocytes, the diagnosis was borne out post mortem; and in the fifth case, with 166 white cells in 100 fields and 89 per cent. lymphocytes, the diagnosis is uncertain, as post-mortem examination was not permitted.

Three Cases, No Bacteriological Diagnosis.—In three cases a diagnosis of purulent meningitis was justified from the macroscopic appearances and the cellular content of the fluids. One case, with four lumbar punctures over a period of six weeks, showed a gradual decrease of white cells from 275 to 6 in 100 fields, and a gradual increase in the percentage of mononuclear cells, from 41 to 94 per cent. a few days preceding death. Tubercle bacilli were not found during life, and post-mortem examination was not permitted. In the second case, during life and post-mortem, a bacillus was found, but not identified; and in the third case no bacteria were found and post-mortem examination was unfortunately not permitted.

These three cases we have classed as meningitis of undetermined origin. Some of the specimens of spinal fluid from these cases were received for examination seventy-two hours after withdrawal, and a satisfactory examination was next to impossible with such material, since within this time disintegration of the cells had occurred and bacterial contamination had taken place. The two cases without autopsies may have been due to the meningococcus, but from the cellular content of the spinal fluid obtained during life the first case was more likely a tuberculous than a meningococcus infection.

These examinations emphasize the importance of examination of the spinal fluid in order to differentiate meningismus from true meningitis, and serous from purulent meningitis; the importance of a careful method of examination for cells and bacilli in the tuberculous cases; the value of cytodagnosis in the study of spinal fluids; the similar changes produced in the spinal fluid by the meningococcus and the pneumococcus infections; the readiness with which the diagnosis of epidemic cerebrospinal meningitis may be made with good technic from freshly-drawn spinal fluid.

The one case infected with both meningococcus and pneumococcus, which resulted in recovery, recalls the fact that the pneumococcus meningeal infection is not necessarily fatal, although a fatal termination is more frequent than in the infection due to the meningococcus.

**REPORT ON GALL-BLADDER SURGERY, WITH
ESPECIAL REFERENCE TO EARLY DIAGNOSIS
AND EARLY OPERATIVE INTERFERENCE IN
CHOLECYSTECTOMIES, WITH BRIEF SUMMARY
OF TWENTY-EIGHT CASES, INCLUDING SIX
CHOLECYSTECTOMIES.¹**

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SINCE surgery of the biliary tract has become such a prominent field, in which so many advances in recent years have been made, I thought I should be justified in offering a few remarks on the subject, and presenting a few cases of interest that have come under my care recently, as well as bringing up a few questions for discussion as to early operative interference, which seems to be one of the leading questions of the day. Gall-stones are of such frequent occurrence that Dr. Hans Kehr, of Halberstadt, states in his most excellent work on gall-stone disease (and I might say here in passing that I know of no better authority on this subject, as he publishes in this book over 547 gall-stone operations, and since the publication of this book he has added many hundreds more to his list, so that he has done, as he says, no doubt, more laparotomies for gall-stones than any living surgeon), "that almost every tenth adult body exhibits them, and quotes the pointed remarks of a surgeon, 'that every theater, every church and every concert-hall would resound with lamentation if stones occasioned discomfort in all cases'; he says that only about five per cent. of gall-stone subjects feel anything of the presence of the unbidden guests, and 95 per cent. remain entirely free, at least from severe suffering. They may have, perhaps, somewhat of dragging in the right side, feel a slight oppression in the stomach and suffer eructations and occasional anorexia, but on the whole there is no question of actual disease."

Even with this small percentage of cases that take on actual disease, it seems to me that any case of cholelithiasis is of such importance as to demand surgical aid, whether they have symptoms or not, for in these early recognized cases we can do simple, uncomplicated operations and achieve brilliant results. I voice here the sentiments of Mr. E. S. Bishop, who has recently said in the *London Lancet*: "It would seem as though the only safe advice which can be given is that gall-stones, wherever they are, should be removed as soon as the diagnosis could be made with certainty," and, further, in support of his statement he says: "No temporizing would be justifiable in the presence of urinary calculus, even though it were not producing active symptoms." Furthermore, the words of Dr. Kehr himself, namely, "That the slight danger of early operations stands in no sort of a relation with the great dangers of the disease itself," are sufficient to urge one on to early interference; at

any rate, such patients should be watched with great care, because all of us are seeing more often cases of gall-bladder disease starting as simple cases of cholelithiasis and going on to some of the worst complicated forms of pericholecystitis, with possible peritonitis, and requiring immediate and prompt operative interference, with very slim prospects of success. Although the diagnosis in many cases remains, in a measure, obscure—that is, as to the exact character of the trouble going on in the gall-bladder. Still, by giving all the care possible toward obtaining a thorough and complete history, and with careful inspection and examination, we can often be pretty confident as to the character and location of the stone, also as to the degree of inflammation present. For instance, we may say, (a) this case is an example of gall-stones in an undistended gall-bladder, with patent cystic duct; (b) this is a case of chronic obstruction of the common duct by stones, gall-bladder being contracted; (c) this diagnosis shows an acute, purulent cholecystitis and local peritonitis; (d) dropsy of the gall-bladder, or hydrops, which is due to a closure of the cystic duct, either by inflammatory process or an impaction in it of a large stone. (A case I have had as an interesting example is one where the cystic duct was completely blocked off by a large stone, and I removed the gall-bladder intact, with the stone still in this impacted condition in the cystic duct. In this case I did a complete cholecystectomy, with an excellent result, having closed the abdomen without drainage; (e) an acute obstruction of the common duct; (f) a chronic obstruction of the common duct, not having to do with stone impaction, but being tumor, possibly malignant, or having to do with the head of the pancreas; (g) another variety still of adhesive peritonitis of the gall-bladder, probably without the formation of stones; (h) an example of old inflammatory processes in the gall-bladder.

The above is a varied list of the conditions that we have to do with and in many of them we can say, oftentimes pretty accurately, if we give special attention to the histories in the case, what character of case it is before operation. But it behooves us not to be disappointed if an error in diagnosis is made and the findings at operation are not just what we expected would be present. We must bear in mind that the upper abdomen, so called, has closely associated so many important structures that Dr. William J. Mayo, in an article on "The Association of Surgical Lesions in the Upper Abdomen," says, very justly, "The palm of a hand may cover a serious lesion of any one of these organs, and that, too, at the point of greatest liability; not only so, but any one of this group may start a pathological process which may extend to any one of the others, and with fully as great frequency as occurs under similar conditions in either generative or urinary systems." All these are not fanciful pictures, the author states, but drawn from every-

¹ Read before the University of Maryland Medical Society in January, 1905.

day work. ". . . I have no hesitation in saying, that with an operative experience of over fourteen hundred cases of this description mistakes in exact diagnosis are still common, and in many instances unavoidable. The history may be the only diagnostic resource when the patient comes to us, and we all know how unreliable that may be." Continuing, he says: "If we clearly understand the possibilities of error, we are better prepared to meet complications, or execute a change of front, and operate on one organ when another procedure was planned. In the majority of cases a pathological diagnosis is possible, and one can say with certainty, this is gall-stone disease or this is ulcer of the stomach, but in a considerable minority a surgical diagnosis is the best that can be made. That is, we can say: In this locality is a diseased process which requires operative treatment, the exact nature of which must be determined by incision. The patient does not come to us for the purpose of having a certain operation performed, but seeks relief from suffering and disability."

It is an undisputed fact that almost all the pathological changes incidental to gall-bladder disease are due to inflammatory processes, which play the leading rôle in all the symptoms of cholelithiasis, by which this many-sided disease makes itself known. Upon the degree of infection, upon the number and virulence of the micro-organisms of the *Bacterium coli*, streptococci and staphylococci depends the kind, intensity and duration of the inflammation, which appears as serous, seropurulent, simple purulent and gangrenous cholecystitis. The typhoid organism is one of importance in this connection, and a careful inquiry should be made in each case as to whether the patient has suffered from typhoid fever. These attacks are oftentimes mild, and are simply attacks of stone colic, but in all events, whether the colic is mild or severe, it seems rational to believe that the infection has taken place; first, directly from the intestine through the common duct into the gall-bladder itself; secondly, from bacteria circulating in the general blood stream and reaching the liver through the hepatic veins; and, thirdly, by the transportation of bacteria from the intestine through the portal circulation; a stone, or many, having been lying quiescent, inflammation starts up which produces the chain of symptoms that occur. As long as the cystic duct remains patent, so that the bile can flow in and out, then the cholecystitis may subside, leaving stones of various sizes in the gall-bladder quiescently reposing, but when the infection has once found a favorable soil, there it creates a *locus minoris resistentiae*, which it always attacks by preference. In this wise the fact is explained that the cholecystitis appears as a recurrent disease, which in its relapses is much more obstinate than appendicitis.

Dr. Kehr very distinctly states: "By this we do not mean that the colic must be present in its former violence; on the contrary, it often lets up

and in its stead appears an obstinate backache, or a nagging, boring, persisting oppression in the stomach. Scarcely another disease runs its course so variably as cholelithiasis and changes its character so suddenly as it. Yesterday the most violent colic raged like a thunderstorm; to-day there has come a calm, which leads the patient quickly to forget the horrible condition of the preceding day. Scarcely has the vomiting disappeared, when the appetite quickly returns, the sunken blanched features become rosy and renew their youth, and no one dreams that the disease is making further progress. And yet, in spite of this external improvement the bile in the gall-bladder turns into pus, the patient has no suspicion what an explosive he conceals in his abdomen. In fact, very frequently the disease, with perverse hypocrisy, conceals under a beautiful mask its horrible features, and unless we surgeons now and then upon a time had the courage, with skilful hand, to tear off the mask, we never would have obtained a conception of the knaveries and wiles of cholelithiasis. It passes still, especially among the laity, as a harmless disease, which is not worth the cost of an operation. How often has this optimistic view of the nature of cholelithiasis caused severe and irreparable injuries, and how frequently a flourishing life has been blighted which might have been saved by an early operation!"

The inflammatory process, which takes place in the gall-bladder, must be regarded in a measure as the expelling force which sets the stone in motion, and forces it, if not too large, to pass the cystic duct, on into the common duct. The stone, if of large size, may give rise to an acute obstruction of the common duct, which occasionally ruptures through into the free peritoneal cavity, or after the formation of a choledochoduodenal fistula into the intestine. (Case V. of my series of cases illustrates this condition, where a large single stone was acutely and tightly impacted in the common duct, and the duct was nearly gangrenous at this point from pressure. In this case there was also an acute cholecystitis and a very tightly distended gall-bladder.) After reaching the common duct, the pathological changes which the stones occasion here are about the same as those which are produced by concretions in the gall-bladder. If the stones are of small size, they are frequently forced on and on by degrees through the ductus choledochus into the intestine, by successive attacks of colic. When they once reach the common duct, however, they are more than likely to lodge there, because the middle portion is more easily dilated than its distal extremity. Once here there is always an interference with biliary drainage, and infected bile and infected secretions from the gall-bladder pass back into the hepatic ducts, and oftentimes set up more or less acute cholangitis, and a later crop or set of stones form in the hepatic or common ducts,

above, or in the gall-bladder, and add to the chain, and thus we often find a chain or necklace of stones in the common duct. (Case VII of my series is an excellent illustration of this condition; in this case I found a perfect necklace of stones in the common duct, six in number, I think.)

The presence of these stones in the common duct keeps up a constant irritation, and the cholecystitis which is sure to accompany these cases causes contraction of the gall-bladder, which sooner or later causes marked thickening and infiltration in the gall-bladder wall, which, if carried to its fullest extent, leaves the gall-bladder a dense, hardened mass of cicatricial tissue, and generally one finds covered over by adhesions which have taken place between the gall-bladder on the one side, and the omentum, stomach and intestines on the other, and I assure you in this condition of affairs one frequently has much difficulty to find his way in this chaos of adhesions down to the gall-bladder and the deeper lying ducts. I saw recently, at the University of Maryland Hospital, with one of the attending gynecologists, just such an obliterated gall-bladder, not much longer than the size of one's little finger. In this case there was but one small stone in the common duct.

Again, stones lying in the common duct often imperceptibly grow and increase, until suddenly a greater swelling of the mucous membrane occurs, possibly from a fresh infection, and a severe attack discloses itself by the occurrence of colic, jaundice, or fever. If it cannot escape into the intestine, then the duct often increases in size to accommodate itself to the increased growth of the stone, or stones, but there is no retrograde wandering of a stone into the gall-bladder. In such attacks as I have just mentioned we often encounter well-marked jaundice—true lithogenous jaundice—occasioned by the obstruction of the choledochus by stone, as distinct from the inflammatory jaundice which we occasionally encounter in acute cholecystitis, and then only when the inflammatory process in the gall-bladder has extended to the mucous membrane of the cystic and common duct.

The general impression that jaundice always belongs to gall-stone disease is incorrect, and no longer is of value. It is absent from 80 to 90 per cent. in all operative cases and the clinician should never hesitate to make a diagnosis of disease of the biliary passages because of the absence of jaundice. That it often is associated with it is true, and attacks of it frequently occur when we have to do with stones in the common duct, which have been driven by inflammation into the continually narrowing portions of the duct, and when there is a large stone in the cystic duct which impairs the patency of the common duct, but seldom does it occur with attacks of cholecystitis and cholelithiasis, where the stones are confined to the gall-bladder.

The occurrence of jaundice, although not necessarily associated as frequently as one was wont

to assume heretofore, is still of the greatest importance in obtaining the history to ascertain this important point, also as to whether it appeared immediately with the first cramp attack, as to how long it lasted and as to its intensity, etc. In chronic obstruction of the common duct by stone, it is of especial importance to determine the intensity of the jaundice, for by this means alone we are often in a position to differentiate stone impaction or obstruction from tumor or new growth formation of the common duct. For in chronic choledochus obstruction by stone the jaundice changes become less marked, and often clear up entirely, while in obstruction by tumor it is constantly becoming more intensified, and upon inspection alone this condition of pronounced continuous jaundice oftentimes will lead you to suspect tumor instead of stone. Then, again, in this condition of deep jaundice, upon palpation of your patient's abdomen over his gall-bladder region, a distended gall-bladder oftentimes is made out; this is another very strong proof that the obstruction is due to tumor, because one usually seeks in vain for a gall-bladder where there is a chronic obstruction of the common duct by a stone, since with common-duct stone we generally have a contracted gall-bladder, and a distended gall-bladder with cancer obstruction. This is according to Courvoisier's law and strongly emphasizes it. The law is practically as follows: "The presence of jaundice, with enlargement of the gall-bladder, suggests cancer. On the other hand, with a history of gall-stones and with the gall-bladder not palpable, it suggests stone in the common duct. In cancer there is very often little evidence of inflammatory reaction, which state is so commonly observed in cholelithiasis."

I have seen this law well brought out in most of my cases, and where one has to do with a deepening jaundice, progressive, which is painless, with emaciation and a palpable gall-bladder, one will almost invariably find cancer as the cause.

This I think an important point, since it is a well-known fact that gall-stones act as a stimulus to cancer formation. Courvoisier, of whom it is said that he was the real father of gall-stone surgery, says he found gall-stones present in 87.5 per cent.; Delano Ames in 95.4 per cent. of the cases of gall-bladder cancer (Kehr).

According to Schröder, 14 per cent. of gall-stone sufferers develop cancer. There are five cases bearing on this point in my list, and Case III of my gall-stone cases developed cancer and died eight months after. Some very large stones were removed from the gall-bladder.

The above statistics alone speak very strongly in favor of early operations for the removal of gall-stones; even though they are not apparently offending, still they may be quietly laying the foundation for cancer.

The condition of the stools, the color, character and consistency should be noted. The color of

the stools should always be noted; as long as they remain putty-colored, no stone will likely be found in the feces, but as soon as the brown color returns then careful examination of the feces may disclose a stone.

Careful observation should be made as to the appearance of fever; the intermittent form is especially characteristic in lithogenous chole-dochus obstruction. Careful stomach analysis should be made, to eliminate possible disease pertaining to this organ as a factor in a given case.

The urine and blood should always be carefully examined, especially the latter, for leucocytosis. It has been my experience to find an absence of leucocytosis in ordinary cholelithiasis, unassociated with cholecystitis, but always a marked increase of leucocytosis after there is any beginning cholecystitis, or whether we have to do with a suppurative condition of the gall-bladder, or an empyema of the gall-bladder; there the leucocytosis, as a rule, is high.

It goes without saying that a general going over the patient is always necessary, and often-times throws important light as to whether it will prove an operable or inoperable case. The patient should be stripped and every organ in his body carefully gone over.

Palpation.—Of all the methods which we make use of in a special examination, apart from careful inspection and a thorough and complete general history, palpation is one of the most important. First, this should be directed in a gentle way to the quadrants of the abdomen not affected, and free from the seat of pain; then after getting in a way the confidence of the patient we should direct our palpation to the field of the disease, namely, to the right hypochondrium, and if there are any changes going on, pain and tenderness will be elicited on palpation. The patient should be in the recumbent position, and, better still, with a small pillow under the small of the back. We get a palpable mass most often when we have to do with an acute perforation of the gall-bladder with local peritonitis present. (This has occurred in five or six of my cases.) Or, again, when we have to do with an overdistended gall-bladder, caused by the common duct being obstructed by tumor (an example of this I have in hospital now, and in this case the gall-bladder could be easily palpated.) Exploratory puncture as a means of diagnosis. I mention simply to condemn.

As to the X-ray, this is in no way an aid, since up to the present I believe one has rarely succeeded with the Roentgen rays in demonstrating gall-stones.

The majority of gall-stone cases occur after the age of thirty years, and are found more often in females than in males, and less frequently in the colored than the white race.

Treatment.—As to this the medical and surgical advice is no longer at variance, and I don't believe that the majority of the profession still cherish the delusion that gall-stones can be dissolved, and regard at best operations for gall-

stone disease as a last resort. This accusation was made in the following words: "Gall-stone surgery has not received in America the acceptance which it deserves, and, furthermore, I don't believe that the American surgeons accept the statement made in Germany that 95 per cent. of cases of cholelithiasis the patients have not suffered from symptoms. These are autopsy findings and the subjects in these cases, as a rule, can give no histories."

I think we are just waking up to the importance of early operative interference and can cite no better evidence of the medical views than by quoting Dr. Musser, of Philadelphia, who has been prominently identified with the medical side of this question. In his introductory remarks to a paper presented before the Congress of American Physicians and Surgeons, he says: "The era we are about to enter bodes for good. It looks as though we would go through the cycles of activity and inactivity, as in the earlier periods of appendicitis, in the treatment of gall-bladder infections."

This writer especially called attention to the secondary manifestations of cholelithiasis, and strongly urged the early surgical intervention to prevent these sequels and complications. He says: "Let us see to it that the primary ailments are cared for, blocking thereby the oncoming of secondary conditions. Fifty years from now the secondary phenomena will be as rare as those which are secondary to disease now removed early, as cataract, appendicitis, vesical calculus and a score of other conditions. Students of that day will marvel at the reports of cases of the present day." He then predicts that many cases diagnosed as tuberculosis, nephritis and cardiac disease will be prevented because they are merely manifestations of terminal infections, the primary source of which is in the biliary apparatus.

From this it would seem that the surgeons are fast getting the medical men into their way of thinking. Only a few years back it was considered that the so-called ideal operation upon the gall-bladder was to open the organ, remove the stones and immediately close it, as likewise the abdominal wound, without drainage. This method seemed when first proposed an effectual and permanent one, getting rid of the tedious process of drainage and obtaining a firm closure of the abdominal wound without fear of hernia. It was soon demonstrated, however, by experienced observers that this method failed to give the essential thing indicated—that is, in most, if not all, biliary affections, namely, free drainage of the biliary passages.

Furthermore, when it was found that immediate closure of the gall-bladder might be followed by a grave disaster, ideal cholecystotomy was abandoned as an unsafe and possibly a dangerous procedure. This method I used in a few of my earlier cases. I remember distinctly one man upon whom I operated on March 27, 1901. He

was deeply jaundiced, and I removed 64 stones from his gall-bladder; found none in the common duct, much to my surprise, as I fully expected on account of his deep jaundice, and closed his gall-bladder, dropped it back and closed his abdominal wound. He made an excellent recovery; his jaundice cleared up at once, and he left the hospital in three weeks quite well. A letter received from his physician only a short while ago, says he has been perfectly well ever since.

The method of operation which provides free and thorough drainage of the gall-ducts and gall-bladder is conceded by the leading surgeons to be the method of choice.

One of the most important steps is to provide a large incision in the abdominal wall, preferably through the right rectus muscle, sufficient to enable one to get the subhepatic space well opened up and well tucked off in order to inspect thoroughly the gall-bladder and the common duct; then, whether the operation resolves itself into either one of cholecystotomy, or cholecystectomy, should be governed by the findings. I am not an ardent advocate for gall-bladder extirpation in all cases by any means; in many conditions it is unquestionably the operation of choice. In my list of twenty-eight cases I have performed six cholecystectomies, and the results in all of them have been most excellent. It is my opinion that when one has to do with a badly infected or possibly gangrenous gall-bladder, with necrosis of the adjacent liver structure and local peritonitis, an extirpation of the offending organ had better be done. In four of my cases of cholecystectomies they were done for this condition. In my other cases of cholecystitis, with gall-bladder stones and common-duct stones, I have removed the stones both from the gall-bladder and from the common duct and drained the gall-bladder freely with gauze drainage and rubber tubing. In a few of my earlier cases I sutured lightly the common-duct incision and drained freely the gall-bladder, and in all with excellent results, save in one, a case of a common-duct stone, which was followed by a fatal issue six weeks after operation; cause of death probably a cholangitis.

Three years ago the surgeons were discussing the question of indications for operating in gall-stone disease; the prevailing opinion was then that the stones should be removed as soon as they begin to offend.

The leading question now being discussed is: Should gall-stones be removed whenever they are known to exist, whether they offend or not, provided the patient's general and local conditions are favorable?

This question was brought out by Dr. Maurice H. Richardson, of Boston, in a paper on "The Surgery of the Biliary Tract," read at the Fifty-fifth Annual Session of the American Medical Association.

The two leading questions he asks in his paper are: (1) Should gall-stones be removed even if they cause no symptoms? (2) What is the im-

portance of biliary drainage after opening the gall-bladder or gall-ducts?

In answer to his first question he is strongly of the opinion that gall-stones should be removed whether they cause symptoms or not, and his final argument in the favor of removing gall-stones when they cause no symptoms, are: First, the known safety of the procedure in the given case, and, secondly, the uncertainty of the future in the same case. It will be a matter of almost absolute demonstration in that case what the course of operation will be—an easy and successful operation. What the course without operation in that case will be no man can tell, except that it may be unfavorable. Gall-stones can never do good; they may remain at a standstill, and they may suddenly cause irreparable damage. Operation may do harm, but in the favorable case assumed, it is almost sure to be effective in removing permanently a source of great danger and unbearable suffering.

The second question he answers by stating that in his judgment drainage should be employed in most gall-stone operations and continued until the bile spontaneously ceases to flow through the wound. Immediate closure of the gall-bladder without drainage, is, in his opinion, in itself so hazardous that it is to be condemned. He is an ardent advocate for free biliary drainage, and says that well-drained cases almost invariably do well. In his opinion it is a most important step in the surgical treatment. He says that non-drained cases, in his opinion, present a considerable percentage of bad end-results. Furthermore, he thinks that among his patients he finds far better end-results from cholecystotomy than after cholecystectomy.

In an article by Dr. Richardson, published in the *MEDICAL NEWS* of May 2, 1903, on the "Indications for the Extirpation of the Gall-Bladder," he strongly takes the side in favor of cholecystotomy as against cholecystectomy, and gives the following advantages and disadvantages:

The advantages claimed for cholecystectomy are as follows: (1) The wound heals immediately and the liability to hernia is therefore slight; (2) there is no possibility of any further gall-stones forming in the gall-bladder; (3) there is no possibility of a subsequent cholecystitis; (4) there is no possibility of malignant growths starting in the gall-bladder; (5) the formation of adhesions is reduced to a minimum.

The disadvantages of cholecystectomy claimed by Dr. Richardson are: (1) There is no possibility of draining the biliary passages, except through one of the ducts, and that only after a difficult and unsatisfactory operation (this seems to be his principal argument against it); (2) there is greater danger in the operation; (3) re-drainage of the biliary passages is extremely difficult and dangerous.

His principal reasons expressed against cholecystectomy are that free biliary drainage cannot be provided for, and this, taken with the fact that this condition is almost always called for

and can be much better carried out when the gall-bladder is left intact, causes him to consider cholecystotomy preferable to cholecystectomy, the latter being at best a far more serious operation.

Before closing I wish to voice my disapproval of a method of dealing with gall-bladder cases which I have seen in some recent publications, principally spoken of in articles on the treatment of gall-stones found as a coincident in abdominal or pelvic operations, viz., while working upon trouble in the lower abdomen it has been suggested to pass the hand up to the gall-bladder region and do a hasty gall-bladder operation, through a very small opening. It appears to me that this is a method which does not show proper respect to this field of surgery. If the gall-bladder operations are to be done, they are to be undertaken with the full knowledge of the fact that one case in five of all gall-stone cases show a stone in the common duct. Judging from the leading surgeons' opinions as to how best to deal with gall-stone cases, this ideal operation, as cited, cannot in this manner be dealt with in a thoroughly satisfactory way. I fully agree that exploration of the abdominal organs while doing laparotomy for something else is a very right and proper thing to do.

There is one thing of special moment and of great interest, and should not be lost sight of, viz., hemorrhage following operations on the gall-bladder. It is not a primary hemorrhage, this does not generally give much concern, it is consecutive hemorrhage, which is due no doubt to blood changes dependent upon prolonged jaundice—some clinical change which inhibits the fibrin-forming element and thus prevents rapid coagulation. This should be kept in mind, especially in cases where there has been long-standing jaundice, associated with any ecchymotic spots in various parts of the body; in one case in my list the cause of death was directly attributable to this form of hemorrhage. It has been suggested that to overcome and avoid the occurrence of such hemorrhage, or, at any rate, to diminish the chances of the occurrence of such hemorrhage, the patient be put on dram doses of chloride of calcium for some days prior to operation. This practice is advocated by Mayo Robson, and it is supposed to increase the coagulability of the blood.

My list of cases, mentioned in the summary appended hereto, comprise twenty-eight cases: Nineteen cases of cholelithiasis, with cholecystitis in one form or another, the location of the stones being both in the common duct and gall-bladder; in five cases the stones were found in both common duct and gall-bladder, and in the rest of the cases they were confined to the gall-bladder.

There were four cases of malignant disease of the biliary tract; in two of which the patient died following operation, the others were left unimproved.

Of these 28 cases there have been six cholecystectomies, in all of which the patients made excellent recoveries; three were done for acute perforative cholecystitis, or empyema of the gall-bladder, where the gall-bladder was gangrenous; one for chronic cholecystitis, with a large stone in the gall-bladder; one for hydrops of the gall-bladder, with a large distended gall-bladder, due to a large stone impacted in the cystic duct (this is Case XII in my list, a case of cholecystectomy in which I removed the gall-bladder intact, not dislodging the impacted stone in the cystic duct; the patient's abdomen was closed without drainage, and he made a beautiful recovery. I have never opened the gall-bladder to remove the stone, as it has made such a pretty specimen of an immensely distended gall-bladder); and one case for biliary fistula, with stones in the gall-bladder and common duct. In this case the gall-bladder was markedly thickened and infiltrated and I deemed it best to remove it. The cases of cholecystectomy are Nos. 11, 12, 13, 17, 18 and 20.

Four of these cases turned out to be liver abscess; they were sent to me, however, for gall-bladder cases, and were put in this list. All of these were opened and freely drained and made good recoveries, and one case is a case of gumma of the liver and perihepatitis. An exploratory laparotomy was done and no opening of the biliary tract was found necessary. The patient healed under one dressing and is getting well under the use of iodide of potash.

SUMMARY OF CASES.

Case I. Cholelithiasis, with marked jaundice. Operation: Ideal cholecystotomy. Cured.—E. B. U., aged forty-four years. She was referred to me at University of Maryland Hospital. She had had attacks of pain in right hypochondriac region at intervals for past seven years; these had increased in severity, and finally occurred on an average of every month, followed by jaundice. Palpation over gall-bladder revealed tenderness; the patient was markedly jaundiced. The abdomen was opened; the gall-bladder found and opened and 44 stones removed; none found in common duct; gall-bladder was sutured and dropped back into the abdomen and abdomen closed without drainage. Patient discharged April 17, 1901. A letter received from her physician in January, 1905, states that there has been no attack of pain since, nor any jaundice; patient has been perfectly well since operation.

Case II. Acute Cholecystitis. Operation: Cholecystotomy. Cured.—A. E., aged thirty-five years. She was referred to me at University of Maryland Hospital for severe attacks of pain in upper abdomen, attended by vomiting, a slight tinge of jaundice and marked tenderness over gall-bladder region on palpation. On April 12, 1901, I opened abdomen, found gall-bladder distended; many adhesions over it;

opened and evidence of cholecystitis noted; no stone found; biliary drainage was introduced into bladder and kept up until it closed of itself. Patient discharged June 1, 1901. Patient seen in 1905 and had had no recurrence of trouble.

Case III. Cholelithiasis, no stone in common duct; five very large stones removed from gall-bladder. Operation: Cholecystotomy. Left hospital as cured. Patient died eight months after operation of cancer of the liver; no evidence of carcinoma seen at time of operation.—C. C., aged forty-nine years. No history of typhoid; history negative as to malignant diseases; patient had enjoyed good health up to the present illness; about January 1, 1901, had an attack of grippe and has been sick off and on up to the time I saw her, May, 1901. Her trouble had been pain in abdomen in region of gall-bladder, at times very severe; attacks of excruciating agony, calling for large doses of morphine; slight jaundice noted; she had lost flesh. Under ether abdomen was opened, gall-bladder opened and a quantity of ascitic fluid came out. Four or five very large calculi were taken from gall-bladder. There was no evidence of trouble in the liver of a malignant type that could be seen or palpated at that time. I palpated liver on entire external and under surface, but found no growth in it. Patient recovered from operation, and returned to her home. I saw her again six months' time and found her with marked ascites, and tapped her, drawing off an immense quantity of fluid, after which I could readily palpate the liver border and could easily make out a hard, nodular liver, which to my touch was unquestionably carcinoma, of which she died.

Case IV. Acute empyema of gall-bladder, with perforation and abscess. Large stones found in gall-bladder. Operation: Cholecystotomy. Cured.—S., aged sixty-four years. A large stout, German woman. I was called to see her for supposed appendicitis, on May 29, 1901. She had marked pain over upper and right side of abdomen; distended mass felt at border of liver, which was tender on pressure, marked rigidity of right rectus and with high temperature and pulse; no jaundice. On following morning at University of Maryland Hospital I opened her abdomen over this mass and came down upon an abscess, which, when evacuated, showed an opening at the bottom which went into the gall-bladder, from which pus also came. Several very large stones were removed from gall-bladder and one found impacted in cystic duct; this was removed and gall-bladder drained. Biliary drainage was kept up for several months until it closed of its own accord. She made an uninterrupted recovery and left hospital four weeks from date of operation.

Case V. Acute impaction of a single large stone in common duct, with acute distention of gall-bladder; common duct at point of impaction about to perforate from pressure. Operation: Choledo-cholecystotomy. Cured.—R. H., aged

thirty-two years. Past history of patient reveals no attacks, previously, of gall-stone colic; four years prior to operation patient's history is that she had peritonitis; sick in bed six weeks, no operation was performed. Further states that she had three attacks of renal colic last September; after which she passed a stone the size of a white bean from bladder. Present history: Taken ill on June 16, with acute abdominal pains situated in the region of the gall-bladder, which grew worse, accompanied with constant and persistent nausea; pain grew intense, localized itself in right side over gall-bladder region, ran up in shoulder on right side; attack was ushered in by a chill. No jaundice present; tenderness noted over gall-bladder. I saw patient on June 18, advised immediate operation; she was sent to University of Maryland Hospital and on the evening of June 19 I operated. On opening abdomen a tightly distended gall-bladder was noted; passing the finger down in the foramen of Winslow I found a large stone impacted in the common duct. The gall-bladder was opened and the stone in the common duct cut down and removed. The opening in the common duct was closed up by two catgut sutures; gall-bladder was drained with tube and gauze drainage. Patient made an uninterrupted recovery. The contents of the gall-bladder were seropurulent, but no organisms grew from cultures taken at time of operation.

Case VI. Cholelithiasis with empyema of gall-bladder. Three stones of very large size, one inch in diameter, removed. Operation: Cholecystotomy. Cured.—R. T., aged fifty years. For over a year patient has had symptoms of pain referable to her gall-bladder region; no definite attacks of hepatic colic; no jaundice; two weeks prior to operation she was taken ill with severe pains in right side, associated with vomiting, and this grew worse; she was brought to me by her physician for supposed appendicitis. Upon examination I found a definite mass in her gall-bladder region, exquisitely tender to touch, and evidence of systemic infection; temperature; pulse and leucocytosis; trouble over lower abdomen. I excluded appendicitis and made a diagnosis of empyema of the gall-bladder. Operation July 20, 1901. Under ether, opened down through the right rectus; when peritoneum was opened an enlarged and tense gall-bladder was found; this was surrounded with gauze, subhepatic space well tucked off and gall-bladder opened. There was evidence of gall-bladder infection and a number of large gall-stones were removed. Gall-bladder drained with gauze drainage and rubber tube; wound closed around drainage. Patient became quite ill immediately after operation and the incision was opened to some extent at the top for better drainage; she made an uninterrupted recovery. In May, 1902, she returned to hospital for relief of a ventral hernia which occurred in upper part of cicatrix; this was closed by a radical hernia operation, under

ether, with excellent result, and she has been perfectly well ever since.

Case VII. Choledo-cholelithiasis. Five stones in common duct; six to eight in gall-bladder. Operation: Cholecystotomy; choledochotomy. Cured.—B. S. T., aged forty-nine years. Present trouble dates back six years, beginning with violent attacks of pain in gall-bladder region, with vomiting and chills; during first year had a period of rest from trouble for five months; since then attacks have been more frequent and ten days has been the longest period of intermission for some time; with these attacks she always has jaundice; last six months pain has been very severe; relief obtained by use of morphine. Loss of weight considerable; patient weighed a year ago 179 pounds, at present 130. I was called to see her, being told that it was a case more than likely of cancer of the liver. I found a patient jaundiced and obtained the before-mentioned history. In between the attacks the jaundice would clear up almost entirely. She was operated upon November 15, 1901, at the University of Maryland Hospital. A necklace of stones in the common duct, five in number, and from six to eight in the gall-bladder were removed. The gall-bladder was drained and the opening in the common duct closed with a few catgut sutures; patient made an uninterrupted recovery; result cured. A letter, received from patient a few days ago, states that she has remained entirely well ever since operation, having had no further trouble whatever.

Case VIII. Cholelithiasis. A number of stones (13 or 14) removed. Operation: Cholecystotomy. Cured.—A. C., aged twenty-nine years. Latter part of October patient was taken with pain in substernal region, or slightly to the right, which lasted for two days; thought it was indigestion; about November 6 she had a second attack, about same as first, pain in same locality; after vomiting attacks would be somewhat relieved, but pain continued, such attacks coming on at shorter intervals. After attacks she would lose appetite and would become jaundiced; operation December 7, 1901; cholecystotomy; drainage; patient made an uninterrupted recovery and has remained well ever since.

Case IX. Single impacted stone of large size in common duct. Operation: Choledochotomy. Died six weeks after operation of cholangitis.—X., aged fifty-three years. Present history: Patient has had trouble with biliary apparatus for fourteen months and at intervals attacks of pain and some slight jaundice, which became worse, ushered in by chills; her temperature following high; had also had trouble for several years with kidneys; urine upon entrance at hospital very scant in amount; full of hyaline and granular casts, with quite a ring of albumin. Leucocyte count, 13,000. She had been persistently jaundiced for several weeks, much emaciated and had been having chills with high temperature. Date of operation, March 8, 1903. Ether; incision through right rectus; opened, gall-bladder was

found tied up by immense number of adhesions and was very much shrunken and thickened, but empty of stones; nothing was found in cystic or hepatic ducts; single stone was found in common duct, which was removed and duct left open. Patient stood operation well. Almost immediately after operation there was a total suppression of urine; following this patient did well and was up on the eighth day. Six weeks from date of operation she developed temperature and the drainage ceased from the biliary tracts; she showed evidences of a cholangitis and died on April 23 of edema of the lungs.

Case X. Cholelithiasis and cholecystitis. Operation: Cholecystotomy. Cured.—D., aged fifty-four years. No history of jaundice; has had some attacks of pain in right hypochondriac region over gall-bladder; the last month pain has been persistent and definitely localized at this point, where there is tenderness on pressure. Operation March 9, 1903; abdomen opened through right rectus; as soon as the abdomen was opened adhesions between gall-bladder and colon were noted, with some thickening of omentum on right side, which was slightly enlarged; 11 stones were removed from gall-bladder, in size from a pea to a cherry; hepatic, cystic and common ducts were normal; gall-bladder well tucked off with gauze, opened and drained. Result, cured.

Case XI. Chronic Cholecystitis. Gall-bladder markedly contracted. Operation: Cholecystectomy No. 1. Cured.—M. N. (colored), aged thirty-four years. Present history: Patient has complained of attacks of pain, jaundice and attacks of vomiting for past year. Date of operation March 18, 1903. Under ether, abdomen opened by right rectus incision, gall-bladder was found thickened and injected and markedly contracted; adhesions to omentum over it; there was a very large gland in the hepatic omentum; there was a stone found situated adjacent to and intimately connected with the common duct; this was dissected away; no stone found in gall-bladder. Gland and gall-bladder removed, the latter on account of thickening and inflammation, a cholecystectomy was done; entire gall-bladder being extirpated down to common duct. Abdomen closed without drainage; patient made an uninterrupted recovery and was discharged from hospital April 18, 1903.

(To be Continued.)

Laryngological Society.—At the eleventh annual meeting of the American Laryngological, Rhinological and Otological Society, held in Boston, Mass., June 5, 6 and 7, 1905, the following officers were elected for the ensuing year: President, Dr. James E. Logan, of Kansas City, Mo.; Vice-Presidents, Dr. Thomas H. Halsted, of Syracuse, N. Y., Dr. William L. Ballenger, of Chicago, Ill., Dr. H. Bert Ellis, of Los Angeles, Cal., and Dr. Henry L. Myers, of Norfolk, Va.; Secretary, Dr. Wendell C. Phillips, of New York; Treasurer, Dr. Ewing W. Day, of Pittsburg, Pa.; Council, Dr. Frederic C. Cobb, of Boston, Mass., Dr. James F. McKernon, of New York, and Dr. H. W. Loeb, of St. Louis, Mo.

ADULTERATION AND SUBSTITUTION.

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FROM time to time there have appeared in the columns of the lay press, in this and other cities, articles and statements reflecting seriously upon the honesty and integrity of the retail pharmacist. The pharmacist as a rule has made no attempt to refute or even correct such statements, knowing them to be untrue, and in nowise substantiated by facts or figures. Portions of the report of the committee on adulteration and substitution of the New York State Board of Pharmacy have been quoted in support of the allegations set forth in these articles, where if the report had been quoted in its entirety, another picture would have presented itself. Alleged interviews with prominent pharmacists, purporting to show that the average pharmacist is a persistent and wilful violator of the pharmacy law, in that he furnishes the public with preparations of inferior strength, solely with the object of pecuniary gain, were also published. The pharmaceutical press has time and time again pointed out the fallacy and untruth of such allegations, at least as far as the great majority of pharmacists is concerned.

These publications have repeatedly shown that the pharmacist, from motives of self-protection, if for no other reason, could not afford to deal in articles and preparations which do not comply with the requirements as set forth in the United States Pharmacopoeia, or if not official, with the tests of purity as commonly applied to such articles. As the pharmaceutical press, however, does not reach the general public, and only in rare instances is perused by the physician, such corrections do not carry the weight they should.

It would, of course, be an insult to the intelligence of the physician were it assumed that he is in the least influenced in his attitude toward the pharmacist, by any statement appearing in the columns of the daily press.

The public, however, being incapable, at least in this instance, of exercising good sound judgment, would be influenced more or less by such articles, particularly when presented in the usual sensational manner. The writer, himself a physician, therefore believes that the medical fraternity can, and ought to, assist the pharmacist in his endeavors to correct the erroneous impression that many pharmacists are dispensers of impure drugs which, by virtue of such false statements, seem to have gained a foothold in some quarters.

The writer is also in a position, being a member of the New York State Board of Pharmacy, and chairman of its committee on adulteration and substitution, to prove, by statistics, that pharmacists, as a class, do not sell or dispense impure or adulterated drugs. In order to substantiate this statement it will be necessary to

explain how the figures which I will present are obtained:

The State Board of Pharmacy is empowered under the Pharmacy Act, to collect samples of all articles named and described in the latest edition of the United States Pharmacopoeia, to have such samples analyzed by its chemist, and in case of deviation from the standard established by said Pharmacopoeia, to proceed against the seller, either civilly or criminally, or both. Accordingly the State Board of Pharmacy, in the person of its duly authorized inspectors, does collect such samples, has them analyzed, and in each case where the findings of its chemist show a deviation from the official standard, notifies the seller of the article that he has violated the provisions of the Pharmacy Act, and that he is liable to the penalty incurred in consequence thereof. During the year 1904, 2,121 samples were collected from pharmacists carrying on business in the territory over which the Eastern Branch of the State Board of Pharmacy has jurisdiction, such territory comprising the counties of New York, Kings, Queens, Nassau, Suffolk, Richmond and Westchester. Located in this territory there are nearly 2,300 pharmacies. Practically all of these were inspected during the year and samples obtained from over 800 of them. Among the samples collected were such as are commonly purchased by the public without a physician's prescription, viz., camphor liniment, soap liniment, spirit of camphor, etc., also such as are generally dispensed only on prescription, viz., tincture of opium, tincture of nux vomica, etc. These samples were collected in all parts of the above-named territory. In some cases they were obtained from stores where the Board knew, or had reason to believe that violations occurred. The percentage of violations are on this account, perhaps even greater than it would have been, had it been possible to collect samples from every store in this territory.

The result of all analyses shows that out of 2,121 samples, 1,853, or 87.37 per cent., were standard, or very nearly so. 117 samples, representing 5.51 per cent. of the total number collected, were found to contain methyl alcohol. Most of such preparations as contained methyl alcohol, were intended for external use. The kind of methyl alcohol employed was the refined variety sold under a certain trade name, and not the ordinary commercial article. The latter statements are not intended to make the violation appear of minor importance, on the contrary the Board of Pharmacy considered the use of methyl alcohol, in any preparation, a gross violation of the law, and in each of these 117 cases a penalty was imposed. Again it must be borne in mind that these 117 samples were not obtained from 117 different sources, but that 3 and sometimes 4 of such samples were purchased in the same store.

151 samples, representing 7.12 per cent. of the total number collected, were upon analysis

found to be deficient in strength, but containing no ingredients except such as constitute the pharmacopœial formula. Such violations are usually the result of a careless supervision during the process of manufacture of such preparations; they may be classed as errors of omission rather than errors of commission. A penalty is imposed for violations of this kind also, the pharmacist being responsible for the quality, strength and purity of every official article or preparation sold by him.

In some cases it was found that the pharmacist sold to the public preparations deficient in strength, while, if a physician's prescription was presented for the same preparations, they were dispensed of a quality strictly in accordance with the official standard. Tincture of Opium and Chloroform Liniment may be cited as examples.

Some of these 2,121 samples were obtained from stores not classified as pharmacies, namely grocery stores, the proprietors of which, under the Pharmacy Act, are permitted to sell certain articles classified as household remedies, cream of tartar, borax, bicarbonate of sodium, etc., serving as illustrations. These articles must, however, conform strictly to the requirements of the Pharmacopœia. Every adulterated sample of cream of tartar was purchased from a grocer, while every sample of drug store origin was found to be pure.

It is also alleged that pharmacists sell and dispense certain proprietary articles which do not conform to the standard of purity for such, and which are supposedly adulterated with inferior and cheaper substances.

As such preparations are not embodied in the present edition of the Pharmacopœia, the Board of Pharmacy is not empowered to take action. It may, however, be said that some time ago, a goodly number of samples of such articles were purchased from retail pharmacists, analyses made, and the results thus obtained made to support the claims of those interested in their sale. A close scrutiny of these results (analytical) does not justify the deductions made therefrom. It appears that in a fair number of instances the analysis showed that a trace of some foreign substance, often less than one per cent., was present. There can be no doubt in the mind of any one, not prejudiced, that if such admixture did exist, the pharmacist is not responsible for it. If a pharmacist desired to adulterate an article or preparation, he certainly would add more than a trace of the adulterant. That such adulteration does exist is not denied. That any considerable number of pharmacists are guilty of such practice is most emphatically denied, and any fair and impartial investigation will substantiate such denial.

The question: Why should there be any violation, on part of the pharmacist, of the Pharmacy Law? may properly be asked at this time. There can, of course, be no justification of such

violations, and none will be attempted by either myself or by the law-abiding pharmacist who constitutes nearly 90 per cent. of the total number.

One can only say, that it is not surprising to find among the nearly 2,300 pharmacists who own or conduct pharmacies in this section of the State, a few who can be denominated wilful violators of the law. In most cases a notification, on part of the Board of Pharmacy, of an existing violation, meets with an immediate response, and a subsequent inspection shows that the evil has been corrected. I believe it can safely be said the violators among pharmacists are fewer in number than among those who distribute to the public the common necessities of life, such as dealers in meat, milk, groceries, bread, and many others. Many of these intentionally or ignorantly, serve the public with wares which prove detrimental to health when consumed.

It is only fair to say that the Board of Pharmacy has at all times received valuable assistance from pharmacists, either as individuals or through medium of the various pharmaceutical associations. They have cooperated with us in our efforts toward a strict enforcement of the Pharmacy Law, more especially that part of it which deals with the purity and strength of drugs and chemicals. Furthermore I will frankly say that I do not believe that pharmacists dispense spurious or adulterated proprietary articles, over the sale of which the Board of Pharmacy has no control, nearly as often as the distributors of such would lead the physician and public to believe.

In further support of my contention, that by far the greater number of pharmacists are perfectly willing to comply strictly with every provision of the Pharmacy Act, it may be stated that they recently had enacted a law, which requires that an apprentice possess a much higher degree of education than heretofore. In addition to this he is required to obtain a diploma from some College of Pharmacy, approved by the Educational Department of this State, before he is entitled to an examination by the State Board of Pharmacy, which examination, if passed, will entitle him to practice pharmacy in this State. Such apprentice must also be in possession of a stated number of regents counts before he can be enrolled as a student by any College of Pharmacy in this State. This certainly should be sufficient evidence that pharmacists are endeavoring to develop the professional side of their business rather than the commercial side. The ultimate object is to elevate the profession of pharmacy to the same level with the medical profession, as far as educational requirements are concerned. The imposition of such requirements has reduced the number of apprentices materially, and in many instances, has necessitated a greater outlay for hire of assistants. The pharmacist can certainly

not be charged with a desire of evading his just and proper responsibilities toward the physician and the public, for he is certainly striving with all his might to safeguard the interests placed in his charge. The great majority of pharmacists feel that they are in duty bound to furnish exactly that which the physician calls for, knowing full well that if otherwise, the physician's skill will not avail, and that his best efforts will meet with defeat. In view of the facts here presented it seems unjust and unfair to charge pharmacists, in general, with practices that are indulged in by the few.

COLDS, AND THE PREVENTION OF COLDS.

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COLD is characterized by an inflammation of the mucous membrane lining the upper respiratory passages. That means the nose, the pharynx, the larynx, and the trachea. Usually these regions are not all involved alike at the same time. Sometimes the larger bronchial tubes are involved. When the deeper tubes are involved the disease becomes bronchitis.

A cold begins with a congestion of these mucous membranes. There are two common causes for this. They are (1) chilling the skin in a person whose skin is sensitive and tender to the influences of cold, causing a contraction of the blood-vessels of the skin, and driving an excess of blood to the deeper structures of the body; and (2) local irritation to the respiratory tract by the inhalation of polluted air, and air containing irritating substances such as dust, smoke, gases, etc.

The mucous membrane of the nose and pharynx has upon its surface, in the mucus which covers it and in its folds and depressions, a large number of many varieties of bacteria. When congestion of the mucous membrane develops, the amount of mucus is increased, and these organisms are supplied with more material to thrive upon. Also congestion diminishes the vital resistance of the mucous membrane, and the bacteria are able to find their way into its substance, penetrating among the epithelial cells. The bacteria produce their ptomaines, which are absorbed into the circulation, and give rise to the fever and general ill-feeling. Locally the swelling of the mucous membrane, the increase of mucus and local heat, give rise to running at the nose, cough and expectoration.

If the conditions which cause the congestion cease to be operative, in a healthy person the mucous membrane will soon dispose of the excess of bacteria, and restore itself to its natural condition. If the primary causative factor continues to operate, or to be frequently repeated, the cold persists. Another feature in the case is this: If the trouble is due to the chilling of a sensitive skin, the other glandular organs suffer congestion as well as the respiratory organs; and the same cold is associated with more or less

disturbance of these other organs. Disturbances of the liver and kidneys, which have much to do with the metabolism and elimination of effete products, result in the accumulation of poisons in the system. Among these are the uric acid group. These lower the vitality of the body, and delay the recovery of the mucous membrane. Thus all of these pernicious influences aid one another and contribute to the illness.

Every one who understands the pathology of this condition, knows of what insignificant importance the medical treatment of the immediate condition is when compared with the very great importance of the preventive treatment. The best of the rational treatment of the immediate condition is to keep the bowels open, and eliminate, as much as possible, the causative factor, i.e., conditions responsible for the congestion of the affected organs.

When we come to the preventive treatment, we approach a subject which has to contend against ignorance and tradition.

The very name itself, cold, has been an obstacle to a correct understanding of this condition by the laity. Colds are most common in cold weather, not because the weather is cold, but chiefly because the most impure air is breathed at that season; and because the skin, which is kept tender with over-clothing, suffers when exposed to outdoor weather.

Colds are conditions of so-called advanced civilization. People who live close to nature are exempt. It is the dweller in the city who is surrounded with the luxuries, who suffers the most. The contrivances that he buys to keep away the cold are responsible for his colds. The woodsman, who works in the cold and sleeps in a freezing hut, enjoys the immunity.

In the prevention of colds there are two most important requisites, pure air and healthy skin and mucous membranes. Pure air is the air found out of doors in the country at every season of the year, day and night. The outdoor air of the city differs but little from that of the country. It contains more smoke, and its dust is richer in bacteria. These are the chief differences. As far as the atmosphere goes, a healthy person thrives about as well in the city as in the country. However, the sufferers from colds are not those who live in the outdoor air, but those who spend a large part of their winter time in an atmosphere which is very different from this. The air in offices, stores, theaters, factories and dwellings, in this climate in the winter time, is bad. Its temperature is usually higher than is consistent with good health; each occupant inhales the materials that have already come out of someone else's lungs, and the percentage of moisture in the air is far below normal. These conditions are due to the defects of the modern heating appliances. It is a long step backward as far as healthfulness goes, from the fireplace of our coldless ancestors to the steam-heated radiator of this catarrhal generation. Of all the iniqui-

tous machinery that has ever been contrived to destroy the weaklings and degenerate the strong, the steam-heated radiator stands pre-eminent. Here is a thing which can be put in a room, and the more tightly the room is sealed against the egress or inlet of air the more quickly will it heat the room and the more is it vaunted as a good thing. The fireplace, the stove, the furnace, all require circulation of air to do their work. The furnace, which has been discarded to give place to this thing, is eminently more rational. Every cubic foot of air from the furnace that enters a room displaces a foot that is there and pushes it out. It will not work unless there is ventilation.

Another defect of most modern heating apparatus is that it dries the air. Examination of the air of rooms in the winter time shows from five to thirty per cent. less moisture than is normally present. That means that indoors people are living in an atmosphere so much below the point of saturation that evaporation goes on from the body much more rapidly than is normal. The result of this evaporation of moisture from the body is a sensation of coolness. It is not uncommon to find in an office a temperature of 70° to 75° F., or even higher, and yet a sensation of chilliness when the moisture is low. In an old-fashioned kitchen, with boiling pots on the stove and the moisture percentage high, the same temperature would impart a decided warmth to the skin. Persons living in these dry-heated rooms are constantly contributing moisture to the air from their skin and respiratory mucous membrane. This keeps up a constant dilatation of the vessels of the moisture-secreting mechanism; and when such persons go into the normal outdoor air with its cool and natural dampness, cold results from the sudden contraction of the vessels which have been so long dilated. Thus we find in our fine modern system for preventing coldness, all of the conditions conducing to colds.

Next in importance is the condition of the skin, and this depends much upon the clothing. The person who is most susceptible to colds is the one who is most zealous in keeping warm. His skin is kept so warm that the superficial vessels are in a constant state of dilation, and woe betide him when he is struck by the cold air. Heavy woolen undergarments next to the skin often have the effect of keeping the skin moist and sensitive. A person whose skin circulation is good has little to fear from chilling blasts; the skin circulation restores itself immediately. Nothing will contribute to the vigor and resistance of the skin more than a daily cold bath, followed by a good rough rubbing. If a man unaccustomed to this luxury begins in the summer with a morning bath from the cold water tap, and continues it through the winter, he will feel well repaid for the few minutes it requires each day. If the temperature of the water is but little above the freezing point, a minute in the water suffices. The exercise of the rubbing with a rough towel sets the circulation going, and

deepens the respirations. The people who do these things know the immunity from colds they enjoy. Many women prefer to use a sponge or shower or the wet flesh brush.

In line with this skin hygiene is the total discarding of wool next the skin. Of all the fabrics of which underclothing is made, wool is the most objectionable for the skin. Its tendency is to make the skin soft and tender, and in many instances to keep it slightly moist. No other material keeps the skin so warm; no other material makes it so sensitive to cold. Healthy skin covered in winter with woven, ribbed or meshed cotton, linen, or rami, is more comfortable, and infinitely less susceptible to cold. These materials should be woven in such a manner as to keep the other clothing far enough away from the skin to give room for a considerable layer of air between. This is accomplished by the meshed linen and rami and by the heavy ribbed cotton underclothing. Physicians in the departments of diseases of the lungs in the clinics of the city are accustomed to the pitiful sight of the chronic chest case and consumptive with his heavy red woolen undershirt and moist, sweaty skin. This greasy thing was a contributory cause of the deplorable state of the unfortunate patient, and now it has become an incubus that helps to drag him down. The inhabitants of northern Russia and the cold climates wear underclothing of coarse linen.

Here is the winter picture of the man who does not suffer with colds. He sleeps in a room with windows opening to the south. His windows are open all night, not an inch at the top and an inch at the bottom, but wide open. He does not fear the night air; he knows that is the only air there is to breathe at night. When the weather is very cold he may moderate this some, or allow some heat to enter the room. Instead of heavy woolen blankets he keeps warm with a down quilt, because it is lighter and more comfortable than the requisite number of blankets would be. He sleeps practically out of doors, but always with sufficient covering to keep his body warm. In the morning he closes the windows and opens the register or dresses in an adjoining room, after having taken his cold bath and rough rub. He has a ready appetite for breakfast. If he is fortunate, his occupation keeps him out of doors most of the time. If his occupation is indoors he walks part or all of the way to business, and breathes deeply; and he brings as much of the out-of-doors into his workroom as possible. On the crowded street car he will be found among the men on the platform, instead of among the huddled herd inside, breathing over and over again the exhalations of their neighbors' lungs. He does not soften his skin with woolen underclothes. He is temperate and healthy.

Colds are most prevalent in winter, not directly because of the cold, but because that is the season when people shut themselves in and

breathe bad air. Most persons who have enjoyed pure air all summer, habitually reverse their practice, and give themselves pure air in winter only when they are out of doors. As a matter of fact cold air is better to breathe than warm air, even though equally pure. It is more concentrated. A cubic foot of cold air contains a considerably greater percentage of oxygen than the same amount of warm air; in other words, every inhalation of cold air gives one more air than he gets with an inhalation of warm air. It is more stimulating to the nervous system. It is invigorating. It increases the oxidation of the blood, and stimulates respiration and digestion. The breathing of warmed air has the comparative opposite effects.

Ignorance and tradition start with the infant to make it susceptible to colds. The grandmothers have promulgated the doctrine that a baby is a delicate thing and must be protected, and they insist upon removing the very conditions into which God had it born. When a mother does the square thing by her child, and surrounds it with normal conditions, the old women say that she is hardening it. As a matter of fact the vast majority of children are subjected to a softening process. Swathing in flannels until the little bodies perspire, and excluding from pure air, does not constitute taking care of children; it constitutes making a care of them. After a baby has been born into the world and become accustomed to breathing its air, it is not the delicate thing that tradition charges it with being, if it is properly fed. The writer knows many instances of healthy children made invalids by overzeal in their care, and a pitiful sight it is to see a naturally robust child coddled into a pallid weakling.

As I write, my infant son, aged eight months, sleeps in his tent-house in the yard. It is December, the temperature is 20° F. Examination would show all of his body excepting his face, perfectly warm and his skin dry. He has on a linen mesh shirt, cotton stockings, and over these are woolen garments sufficient to keep him warm. At night his bedroom has two south windows open sufficient to give him good air. When put to bed for the night he wears a linen mesh shirt, a cotton flannel nightgown closed at the bottom. He sleeps in a woolen sleeping-bag shirred about his neck, with his arms coming out through the sides. Over all is spread the covering, depending upon the weather, a down quilt being used when it is cold. This is pinned so that it is fast at his shoulders, and to the bed, far enough away to give his arms liberty, and then turned under at both sides and at the foot. He has never been found to be cold; and he never perspired but once, and that was when a grandmother violated instructions and put an extra blanket over him for fear he would be cold. The contrast is a very striking one when this healthy boy is placed beside his little warm-air neighbors of the same age. The human kind and its infants are well

adapted to breathe God's pure air. It cannot be improved.

The skin of infants can be kept in condition to repel cold. The child should have a daily bath, at a temperature considerably below that of its body. This should be followed by a good rubbing and massage of the limbs and body until the skin is warm. If for any reason the bath is best omitted, the general massage may still be given. The very important thing is that the child shall be so clothed that it shall never perspire.

Colds are an artificial condition brought on by artificial conditions. When explorers go into the Arctic regions, where they are exposed to great cold, they are particularly free from colds. This simply means that they are breathing air rich in oxygen and comparatively free from the contaminations of the air of civilized life. The poor man, whose work keeps him outdoors in winter and who sleeps in a cold room at night, does not suffer with colds. It is the rich man, the office worker in the steam-heated building, who has a nice warm comfortable bedroom, who suffers. It is a fact, however, that a large proportion of the outdoor workers sleep in illy ventilated rooms, and live unhygienically excepting during the eight hours of labor, while a large number of the indoor workers surround themselves with healthful conditions at all times excepting when at business. The candidate for colds and consumption is the unfortunate who both works and sleeps deprived of fresh air.

The modern treatment of consumption has resolved itself into a matter of pure outdoor air. Twenty-four hours a day in the outdoor air, winter and summer, are insisted upon. Since this has been made the chief point of treatment, and other matters made secondary to it, the mortality from consumption is being reduced.

As heating materials become more expensive, greater economy in conserving the heat in buildings is practised. The proprietors in office buildings conserve the heat by minimizing the amount of fresh air which they allow their tenants. Colds are the result.

The importance of pure air in the treatment of pneumonia is becoming well appreciated. There is no greater sin committed against a patient suffering with pneumonia than that of keeping the windows closed and ventilation shut off in his sickroom. I have recently seen a case of pneumonia being administered artificial oxygen in a room tightly closed and heated by a radiator. When the windows were opened and the patient given a fair chance simply to have pure normal air, there was no necessity for the artificial administration of oxygen.

Lying at the foundation of the popular aversion to pure air is the ancient error that colds are due to cold air in the winter time; and the mysterious miasms, supposed to reside in the night air, in the summer time. We now know that colds are not due to cold, and that the chief dis-

ease-bearing emanations of the night reside not in vague ethers, but in insects.

Chemical science and physiology have not yet completed the analysis of the air and the study of its relation to the human organism. There yet remains much to be learned concerning this vital fluid. There is something more in air than oxygen that we need.

Pure air is one of Heaven's greatest gifts. It contains the most important elements of our food. We were born into it and adapted to its use. Of those who live in it, it breeds a race of strong men. And those who continually breathe it when polluted and defiled pay the penalty of weakness and emasculation.

THE CARBOHYDRATE REACTIONS OF THE PARATYPHOID OR PARACOLON GROUP (PRELIMINARY COMMUNICATION).¹

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For the past two years a number of cultures of bacteria belonging to the group known variously as the Gärtner, the Hog Cholera, the Intermediate, the Paratyphoid, or the Paracolon Group, have been tested upon a large series of carbohydrates, with the purpose of determining whether any cultural criteria can be established to account for the variations in agglutinability shown by the different members of this group. As requisite cultural reactions for including any particular micro-organism in the group the following characteristics have been considered essential, viz., bacilli measuring from $\frac{1}{2}$ to 1 micron in width by 1 to 2 microns in length, exhibiting definite motility due to the possession of peritrichic flagella; development upon the surface of flat media, such as agar and blood serum, as a fairly thick, moist, translucent growth similar in general to that produced by *Bacillus coli* or *Bacillus typhosus*; agar and gelatin colonies when deep, being round or oval and showing frequently fairly definite nuclei, when superficial, being flat, rather thin, opaque, with circumscribed or slightly crenated borders; no pigment production; no spore formation; no secretion of proteolytic enzymes and hence no liquefaction of gelatin, casein or blood serum; fermentation of dextrose with the production of acid, and gases in variable quantity but with a definite ratio of hydrogen to carbon dioxide, there being two or three of the former to one of the latter; no fermentation of saccharose or lactose, the reaction in the presence of these sugars becoming alkaline; growth in milk either showing a preliminary acidity yielding to a terminal alkalinity, the alkali being sufficient to saponify the proteids in the milk, or showing a definite persistent acidity not great enough in any case to coagulate, these milk reactions forming the basis for the ordinary division of the group into two main subgroups, Type A and Type B.

¹ From the Bacteriological Laboratory, Johns Hopkins University.

The following cultures have been available for study, many of them being strains obtained from different sources and kept in stock in the bacteriological laboratory of the Johns Hopkins Hospital, and many of them being personal isolations by the writer from the contents of the intestinal tract or from the internal organs at autopsy.

Bacillus of Hog Cholera.—Five cultures, one obtained from the Bureau of Animal Industry, one from the Army Medical Museum, two by Billings from epidemics of Hog Cholera and labeled by him, "Schweineseuche," and one from Dr. Theobald Smith, originally derived from an epidemic of the disease in Maryland.

Bacillus enteritidis of Gärtner.—Obtained from Dr. Durham of Cambridge, England.

Bacillus typhi murium.

Bacillus septicus murinus.—Obtained from Dr. Carter from an epizootic among guinea-pigs in the Pathological Laboratory of the Johns Hopkins Hospital.

Bacillus of Swine Dysentery.—Obtained from Dr. Theobald Smith.

Bacillus of Cattle Disease.—Obtained by Dr. Möhler from an epidemic among cattle, and studied in the Bureau of Animal Industry.

Bacillus of Rat Plague.—Obtained from Dr. Rosenau of the Bureau of Public Health and Marine Hospital.

Bacillus septicus murinus.—Obtained from Kräl.

Bacillus icteroides.—Two cultures, one from Dr. Sanarelli, Hygienic Institute, Bologna, and one from the Pasteur Institute, Paris.

Various paratyphoid or paracolon cultures isolated in different laboratories and known in the literature by the names of the investigators obtaining them, viz., Buxton, Gwyn, Cushing, Strong, Wells and Scott, Smith, Kurth.

Other paratyphoid or paracolon cultures known as Badach, Milefsky, Olsen, Müller, nad Hunnamann, and obtained from cases of paratyphoid fever by Johnston, Howard and Schottmüller.

Finally, eight cultures obtained by the writer from more or less normal individuals in whom the occurrence of the organisms could in no way be associated with pathological changes. Several of the latter cultures were obtained from individuals suffering with transient diarrhea, others from the intestinal tract or the internal organs at autopsy.

As control cultures, *Bacillus coli* and *Bacillus alcaligenes* Petruschky were employed. The culture of *Bacillus coli* was obtained by Dr. Jobling from the normal intestinal tract and ferments dextrose, saccharose and lactose. That of *Bacillus alcaligenes* was obtained in the Pathological Laboratory of the Johns Hopkins Hospital by Dr. Harris, from an autopsy where a terminal invasion by this micro-organism had occurred. It agreed in all details with the original descriptions given by Petruschky. Both the *Bacillus coli* and the *Bacillus alcaligenes* were of considerable virulence for smaller animals.

All the cultures studied were subjected first to careful preliminary plating and cultivation, to restore to them any latent activities. They were originally tested nearly two years ago. Subsequently, they were kept in stock in the Bacteriological Laboratory, and again tested upon the entire series of carbohydrates. These were utilized in one per cent. solution added to sugar-free broth in the Smith fermentation tube, being sterilized by the use of streaming steam for one-half hour for three successive days. The following carbohydrates were employed:

Mono-saccharids, dextrose, levulose, galactose, mannose.

Poly-saccharids, saccharose, lactose, maltose, melitose, raffinose, melibiose (hydrolysis of raffinose), arabinose, xylose, rhamnose.

Alcohols, mannite, dulcitol, erythrite.

Starch, dextrin, inulin.

Certain of these substances proved to be of no value for differentiation, not being attacked by *Bacillus coli* or by any members of the group in question, and may therefore be left out of consideration. Here may be included dextrin, inulin, glycerin and erythrite. Although both dextrin and glycerin have been stated by certain observers to ferment with *Bacillus coli*, fermentation does not occur with pure samples of these substances and the various cultures of *Bacillus coli* which we have in the laboratory. This point, however, still needs confirmation, but for our present purpose it is of no importance.

The reactions obtained by the use of this wide range of carbohydrates shows definitely that the *paratyphoid* and *paracolon* group, as now defined, embraces a number of different micro-organisms with a wide range of fermentative activities, and I therefore submit the following scheme as a preliminary report upon a rearrangement of the entire group from *Bacillus alcaligenes* to *Bacillus coli*.

Type I.—Ferments no carbohydrates. Represented by *Bacillus faecalis alcaligenes* Petruschky.

Type II.—Ferments the Monosaccharids; dextrose, galactose, levulose, mannose, and the Polysaccharid maltose. Represented by a number of cultures isolated by the writer from the contents of the normal intestine.

Type III.—Ferments the Monosaccharids, dextrose, galactose, levulose, mannose, the Polysaccharids, maltose and rhamnose, the Alcohols, mannite and dulcitol. Represented by the *Bacillus* of Hog Cholera, all the cultures of which agree in their fermentative reactions.

Type IV.—Ferments the Monosaccharids, dextrose, galactose, levulose, mannose; the Polysaccharids, rhamnose, maltose and arabinose; the Alcohols, mannite and dulcitol. Represented by *Bacillus typhi murium*, *Bacillus paratyphoid* Müller (Schottmüller), *Bacillus paracolon* Gwyn, *Bacillus paracolon* Olsen (Howard), *Bacillus paracolon* Badach (Johnston), *Bacillus paracolon* Milefsky (Johnston).

Type V.—Ferments the Monosaccharids, dex-

triose, levulose, galactose, mannose; the Polysaccharids, maltose, rhamnose, arabinose, xylose; the Alcohols, dulcitol and mannite. Represented by *Bacillus enteritidis* Gärtner, *Bacillus cattle disease* Möhler, *Bacillus rat plague* Rosenau, *Bacillus septicus murinus*, *Bacillus of guinea-pig disease* Carter, *Bacillus of swine dysentery* Theobald Smith, *Bacillus icteroides* Sanarelli, *Bacillus icteroides* Pasteur Institute, *Bacillus paracolon* Cushing, *Bacillus paracolon* Strong, *Bacillus paracolon* Buxton, *Bacillus paratyphoid* Hunnemann (Schottmüller) *Bacillus paratyphoid* Kurd.

Type VI.—Ferments the Monosaccharids, dextrose, levulose, galactose, mannose; Polysaccharids, saccharose, lactose, maltose, xylose, arabinose, rhamnose, melitose, raffinose, melibiose; Alcohols, dulcitol and mannite. Represented by *Bacillus coli*.

This last type may, of course, be subdivided according to the fermentation of saccharose into two varieties of *Bacillus coli*, one fermenting and one not fermenting this sugar.

A number of interesting facts appear from a consideration of these fermentative reactions, which justify the use of such a large number of carbohydrates and suggests the practical value of the use of some of the higher sugars, notably arabinose and xylose. Of greatest importance possibly is the readiness with which the bacillus of Hog Cholera can be differentiated from the other members of this group. The particular series of carbohydrates fermented by this bacillus, consisting of dextrose, levulose, galactose, mannose, rhamnose, maltose, dulcitol and mannite, is not fermented by any other organisms now in the laboratory, and we are thus able to distinguish the hog cholera bacillus from *Bacillus enteritidis* Gärtner, from bacillus of cattle disease Möhler, from bacillus of swine dysentery, from the micro-organisms parasitic in some of the smaller species of animals, as guinea-pigs and rats, and from those parasitic in man, such as *Bacillus icteroides* and the various paratyphoid bacilli.

Next, the paracolon bacilli belonging to the normal intestinal tract can be easily distinguished from those isolated from cases of general infection in man, by their low fermentative powers, standing close to *Bacillus alcaligenes* in this respect; while the micro-organisms isolated from pathological conditions appear to be much more closely allied to the typical *Bacillus coli*.

Finally, the separation of the paratyphoid or paracolon bacilli proper into two main subgroups, Type A and Type B, according to their milk reactions, as was pointed out by Buxton, Johnston, Brion and Keyser, and several others, is confirmed by the action of these different cultures upon xylose. This may prove to be a point of considerable importance, inasmuch as practically all the members of this group when tested repeatedly and carefully exhibited a terminal alkalinity in milk, this alkalinity varying in the time of its development dependent upon the activity of the micro-organisms.

This "scheme" is, of course, open to criticism and its arrangement may have to be modified subsequently. In view of the fact, however, that agglutination reactions are being conducted upon the various members of this group according to the rearrangement, the results of which cannot possibly be published for some months, it was deemed advisable to publish this work in its present condition.

MEDICAL PROGRESS.

MEDICINE.

Uric Acid.—In the May 13 issue of *The Journal A. M. A.* is completed a series of special editorials critically summarizing what is known of the physiological and pathological action of uric acid in the human organism. It is surprising, *The Journal* remarks, what a small bulk of well-determined facts has been accumulated and how much time and labor have had to be spent to prove the erroneousness and harmfulness of most of the speculative views that have been advanced. It is worth much, however, to have learned the chemical and physical qualities and relationships of uric acid; to have distinguished the exogenous and endogenous uric acid of oxidative origin and between these and that of synthetic source; to be informed, even partially, as to the methods of its formation and destruction, and the approximate localization of these processes in the body; and to have recognized that the substance probably circulates in the blood chiefly as mononatrium urate or in combination with thymic acid. It is also of importance to have learned on the pathological side that gout is probably the only disease for which disturbances of uric acid metabolism are directly and mainly responsible. The bearing of the facts so far ascertained on the rational treatment of gout is pointed out. In combating the primary disorder of metabolism we must protect against the influences that favor its development, and we may also attempt to prevent the deposit or excess of uric acid or urates in the body. The formation of exogenous uric acid can be largely controlled by diet, limiting the nucleins and purin derivatives in the food. There is no certain proof that drugs can diminish uric-acid formation, though chincin acid has been reckoned as one that does so. If it has such effect its mode of action is not known. To increase uric-acid excretion, the best means is to increase the secretion of urine; hence, copious water drinking is advised. How to destroy uric acid in the body is not clear; there is no proof that there is any diminution of the oxidative processes in gout or any basis for the view that drugs hasten uric-acid destruction. The fallacies of the popular so-called "antilitic" and "uric acid solvent" treatments are shown by the fact that it is impossible to produce in the blood and tissue juices exactly the soluble urate needed, and by the further fact that the solubility of any urate is decreased by the sodium salts in the blood. If uric acid is to be rendered more soluble in the blood it must be by the formation of some easily soluble combination with other organic compounds, with production of substances which are not dissociable, i.e., which are not salts. Uric acid combines with thymic acid in this way, and also with formaldehyd, forming a non-salt-like compound, but it is doubted whether such substances ever really exert any beneficial influence in gout. On the whole, the best that can be expected from drugs at the present in gout appears to be the relief of pain by the salicylates, colchicum, etc. The mainstay of the therapy in the dis-

ease consists in a well-regulated regimen, for the acute attack rest and local applications, and for the tophi in the joints local phagocytic activity may be excited by means of hot applications and massage.

Alleged Destruction of Red Blood Corpuscles in the Spleen.—EDWARD T. WILLIAMS (*Amer. Med.*, May 13, 1905) gives a complete translation of Kölliker's utterances on this subject, taken from his work on "Microscopical Anatomy." Kölliker thinks that red blood corpuscles are not a natural element of the spleen, but result from hemorrhagic effusion. They then pass into dissolution. This occurs through the formation of large blood-corpuscle-holding cells, by the spontaneous development of an investing membrane round a clump of corpuscles and of a nucleus in the interior. The corpuscles immediately break up into pigment granules and soon disappear altogether. This is seen in almost all animals. The arguments pro and con are stated at length, and the author confesses that he was often tempted to abandon the theory and go over to the opposite view of Hewson, but always came back to his original opinion. In commenting on this theory, Williams declares that the idea of a perpetual splenic apoplexy affecting all animals throughout life without the slightest effect on their health is inconceivable. Moreover, the alleged effusion never clots, never distends the organ, never displaces the tissue fibers, and never excites inflammation. Kölliker fails to state his method of examination. He used no fixatives, and tacitly admits that he examined some specimens in water. He used pathological, and, probably, partly decomposed spleens. Scherer, as quoted by Kölliker, found putrefactive products in spleens, which could not have occurred had he used fresh specimens. Williams found dissolving blood corpuscles in specimens treated with water, salt-solution, artificial serum, and to some extent in preparations fixed by heat and stained with watery solutions of the aniline dyes. Since he had used only fresh spleens fixed with sublimate-salt and stained with hematoxylin-casin he found none at all. Hence, he was forced to conclude that Kölliker's theory was a chimera. Kölliker was a great anatomist, but not a great thinker. He is believed to have been mistaken in the present case.

The Treatment of Pulmonary Hemorrhage.—W. A. DICKEY (*Med. Standard*, May, 1905) considers that in the great majority of instances hemorrhage from the lung is due to the erosion of a blood vessel in a tuberculous cavity. It often becomes a serious question of what is to be done in these cases. The author considers that in the general treatment the patient should be kept as quiet as possible, in some cases not even allowing him to be moved. The clothing should be loosened and the patient placed in a semi-recumbent position, and on the diseased side. This position favors gravity, the heart being less able to propel the blood into the ruptured blood vessel; hence, the clot is more readily and quickly formed. This position also favors the removal of blood and mucus. If fiber hemorrhage is at all severe, the patient should be given one-fourth grain of morphine with one one-hundred-and-fiftieth of a grain of atropine. In this way he is quieted, the cough relieved and the shock from which he is suffering is very largely overcome. If the heart continues to beat rapidly and forcefully there are three remedies that should always be thought of: Aconite, gelsemium and veratrum viride. These are all cardiac depressants, reducing the force and frequency of the heart action. At present adrenalin chloride is being highly recommended, but it is extremely doubtful if it affects deep-seated hemorrhages. In the more pronounced cases subcutaneous injections of 40 to 50 c.c. of

a 10 per cent. solution of sterilized gelatin can be used with advantage. Pellets of ice, by mouth, and an ice-bag over the affected side are useful. In those rare cases in which the individual is well-nigh exsanguinated in a short time, and the heart becomes weak, feeble and rapid, the eyes sunken, the nose pinched, the skin cold and clammy, in short, every symptom of collapse is present, prompt action is necessary. Digitalis should never be used. Camphor hypodermically given in sterilized olive oil, one part to four of oil, aromatic spirits of ammonia, hypodermoclysis and enteroclysis are advised. Bandaging of the extremities for periods of fifteen minutes is followed by good results. The diet advised is liquid, and should be highly nutritious.

The Desmoid Test.—In a second communication, H. SAELI (*Corresp. f. Schweiz. Aerzt.*, May 1, 1905) describes the practical value of the desmoid test, introduced recently to replace the more troublesome expression of the stomach and chemical examination of the stomach contents. Briefly, the method consists in giving per os a small pill of iodide of potash or methylene blue, enclosed in a small gutta-percha bag, which is tied off by means of a small strand of raw catgut. This catgut will not be affected by the pancreatic secretion, and will only dissolve in the stomach if there is free hydrochloric acid present. The fact that it has dissolved can be determined by examining the urine for iodine or methylene blue or the saliva for iodine. The bag is swallowed directly after dinner, between 12 and 1 o'clock, and the urine then tested between 5 and 7 o'clock in the evening, and again the following morning. An early positive reaction will be evidence that the stomach has digested the meal, while absence of reaction will point to a lack of hydrochloric acid. In a few control cases the catgut was evidently digested, yet the stomach contained no free acid after a test meal. The explanation of this is that the dinner which precedes the pill is a much stronger stimulus than the test breakfast, and may yet bring about sufficient secretion to digest the meal satisfactorily. The desmoid test is, therefore, a more delicate test for the digestive function of the stomach than even the test breakfast.

Left-Sided Gastric Pain.—Prof. RIEDEL (*Munch. med. Woch.*, April 25, 1905) points out that gastric pain occurring reflexly from disease of other abdominal viscera is most often referred to the right side, so that left-sided gastric pain, in the great majority of cases, signifies an affection of the stomach itself. The only two exceptions, fat necrosis of the pancreas and splenic abscess, are so rare that they can be disregarded. An ulcer situated at the pylorus is much harder to diagnose than one in the body of the stomach, since the former gives rise to pain on the right side, which often cannot be distinguished from the pain caused by cholecystitis. With ulcers of the antrum pylori, the pain is accurately referred to the median line just like the reflex abdominal pain caused by chronic appendicitis and that of a hernia of the linea alba. Tumefaction is exceedingly common with ulcers, since the muscularis and serosa will thicken and adhesions will readily form with the neighboring organs, particularly the liver and the pancreas. A mass may thus be felt to the left of the median line, if the ulcer is situated in the middle portions of the stomach. It is very important to diagnose the case sufficiently early, since the end result will be an hour-glass stomach, which can only be treated by means of an operation. The history is rather characteristic: At first there is an attack of left-sided pain directly after eating, lasting several hours. Several months later there may be another attack, the stomach having been perfectly normal in the meantime. In six

months or so the pain comes more often and lasts as long as twelve hours, and the irritability of the stomach increases. Finally, vomiting sets in half an hour after a meal. This is purely reflex; since a stenosis has not yet formed. The pain is now permanent and vomiting occurs daily, but blood is found in only half of the cases. Operation is indicated, if rest in bed for several weeks with hot applications and fluid diet does not result in a cure.

The Early Diagnosis of Tuberculosis.—F. MARIANI having investigated urinary tuberculosis, has come to certain conclusions regarding its early diagnosis (*Wien. klin. therap. Woch.*, March 12 and 19, 1905). In his first experiment he used two patients, one with tuberculosis of the lungs and broncho-pneumonia, the other did not have tuberculosis. The twenty-four-hour amount of urine was collected from each. One thousand c.c. of each was taken and evaporated and reduced to 20 c.c. on a water bath. Four guinea-pigs were injected with 5 and 10 c.c., respectively, of the urines. The same night all four of the animals were dead. Hence, he concluded that concentrated urines were toxic. In the second experiment, urines of two patients, one with tuberculosis, the other without, were used. These were reduced to one-fiftieth of their original volume as before. The concentrated urines were then put in dialyzing tubes and left in running water for forty-eight hours. Two healthy guinea-pigs were injected with 5 c.c. of concentrated and dialyzed urine of each patient. After forty-eight hours the pigs injected with the urine of the tuberculous patient were dead, while those of the other patient were well. This experiment was repeated with five other pigs with the same results. The author's conclusions from this experiment are that the concentrated and dialyzed urine of a patient suffering from tuberculosis contains poisonous material which kills healthy guinea-pigs, while that of a non-tuberculous person is harmless to them.

In the third experiment, he added 5 c.c. of a solution of tuberculin to 400 c.c. of urine from a healthy person. This was reduced and dialyzed as in the second experiment. If none of the tuberculin has been lost a guinea-pig weighing 500 gm. should be killed by it. Instead of one, two, weighing 260 gm. each, were used, and after two days died. Autopsy showed the congestion typical of tuberculin poisoning. The inference drawn from this experiment is that the tuberculin is not broken up during the experiment, nor is it lost in dialyzing. For experiment (No. 4) four guinea-pigs were taken of about 300 gm. weight. Two were injected with 5 c.c. of urine of the tuberculous patient mentioned in experiment No. 2, the urine being concentrated and dialyzed as usual. Two other pigs were treated the same way, except that 1 c.c. of antitoxic serum was injected. The two treated with the urine alone died, while those injected with antitoxic serum were alive three days later. The conclusion from this experiment is that the urine of a person suffering from tuberculosis contains tuberculin.

In experiment No. 5, five patients were used, one with pneumonia, one with typhoid fever, one with facial erysipelas, one with carcinoma of the stomach with cachexia, and the last with influenza and broncho-pneumonia. Twenty-four-hour amount of urine was taken from each, treated as in the former cases, and two pigs injected with 5 c.c. of prepared urine of each patient. All pigs were alive two days later. He concluded that the urine of patients with or without fever, who have no tuberculosis, contains no poison which can kill a healthy guinea-pig. The same fact holds with the urine of patients who are well. In experiment No. 6 three patients with bronchiolitis circumscribed at one point, in whom

the general condition was very good, fever absent but tubercle bacilli present, were used. Healthy rabbits were injected with 5 c.c. of urine prepared as above, and none died. The conclusion in this experiment is that the urine of tuberculous patients without fever, whose general condition is good, and the disease circumscribed, has no poison the result of tuberculosis which can kill healthy guinea-pigs.

In experiment No. 7 20 healthy pigs were inoculated with virulent cultures of Koch's bacillus. Seventeen days later all had tuberculosis, as evidenced by temperature, loss of weight and enlarged glands. The urines of the three patients with the circumscribed processes in the last experiment were then collected, together with that of three others, one with typhoid fever, another with anemia from ancylostomiasis, and the other a healthy person. The urines were treated as usual and 5 c.c. injected into the tuberculous guinea-pigs. Those subjected to the urines from the tuberculous patients died in two days, while the other three showed no disturbance. The conclusions in this experiment show that the urine of the tuberculous who are in good condition contains tuberculous poisons which kill tuberculous guinea-pigs, while the urine of a healthy person or one sick of other diseases does not possess this property. In experiment No. 8 the urine of a patient supposed to have tuberculosis (with emaciation, anemia, no temperature and no localization) is treated as usual, and 5 and 10 c.c. injected into two tuberculous rabbits. Both survived. The serum of this patient agglutinates with a homogeneous culture of tubercle bacilli, concentration 1:20. By another method the author now proceeded to concentrate the urine, i.e., at a temperature of 104° F., in a partial vacuum. Brought down to the same concentration as before, they were then dialyzed as usual. The agglutination of the resulting liquid was tried with a culture tubercle bacilli and found positive 1:40. Two guinea-pigs were then given a deadly dose of tuberculin, plus 5 c.c. of this liquid, while to a third one was given tuberculin only 1:100. After two days the last pig died, while the two former were alive. The urine of this patient contains no tuberculous poisons which can kill tuberculous guinea-pigs, yet there is in it agglutinins and the antitoxins of tuberculosis. In other words, the patient was tuberculous and produced antitoxin in excess. In order to be more sure in this last experiment the patient was given 1 mg. of tuberculin. Six hours later the temperature was 100.1° F., which showed that tuberculosis was present in a latent condition. In experiment No. 9, a typhoid fever case, twentieth day, serum diagnosis present 1:80. Urine treated as in experiment No. 8, and its agglutination tried with a typhoid culture; result positive, 1:200. The agglutination is not destroyed in a vacuum by diagnosis. In experiment No. 10 the urine of a case thought to be tuberculous meningitis was taken. Treated as in experiment No. 9. Two guinea-pigs were inoculated with 5 c.c. of this urine. The animals died in thirty-six to forty-eight hours. The diagnosis of tuberculosis was confirmed at autopsy. Another case supposed to be tuberculous came to the clinic, showing no objective evidence. Five c.c. of urine, which was prepared in the usual way, was injected into animals, but they did not die. The urine, treated by the cool method, showed agglutination at 1:20. A healthy guinea-pig was inoculated with 5 c.c. of this urine, plus a deadly dose of tuberculin, while another pig received only tuberculin. The first animal lived, the second died in three days. Diagnosis: Latent tuberculosis, with a tendency to form antitoxic substances. The patient showed a

positive reaction when 1 mg. of tuberculin was injected. Experiment No. 12 A patient, thirty-two years old, who had suffered for three months with slight hemoptysis. No objective signs. The urine was prepared by the warm method, and 5 c.c. injected into two pigs. One died after two, the other after five days. Diagnosis: Latent tuberculosis. On completing the history it was learned that the mother and two brothers had died of tuberculosis, and a third brother had it. Experiment No. 13. Tuberculosis in the family history. The woman, who had gone through two pregnancies, wanted to know if she could hope to go through a third normally. No objective signs of tuberculosis. The urine, treated as usual, kills guinea-pigs. Tuberculin injected gives a positive reaction. Experiment No. 14. Two urines from unknown patients obtained from Prof. Maragliano. Half of each urine was treated by the warm and half by the cold method. Urine No. 1, concentrated by heat, killed tuberculous guinea-pigs. The part treated by the cold method showed no power of agglutination. Diagnosis: Tuberculosis, with little resisting material. Urine No. 2, concentrated by heat does not kill tuberculous guinea-pigs. The urine treated by the cold method agglutinates 1:30. Latent tuberculosis, with formation of antitoxins, was the diagnosis. These diagnoses agreed with those previously made by Prof. Maragliano. Experiment No. 15 consisted in taking the urine of three patients suffering, respectively, from alcoholism, neuralgia and mitral insufficiency. All were robust and tuberculosis can be certainly excluded. The urine was treated both by warm and cold methods. Two tuberculous guinea-pigs were inoculated with the urine of each, and none died. The agglutination was tried in the urine by the cold method, and found to be negative in every case. To determine the possibility of antitoxin being present in those patients, three healthy guinea-pigs were given a deadly dose of tuberculin, plus 5 c.c. of urine prepared in the cold way. All three died in the course of three days. Therefore, there was no antitoxin in their urines. Next, the same three patients were each subjected to of 1, 2 and 3 mg. of tuberculin at intervals of three days, with negative results. The conclusion from this experiment is that non-tuberculous individuals have in their urine neither toxins, agglutinins, nor antitoxins.

General Conclusions.—The poisons of tuberculosis, agglutinating substances and antitoxins, can all be found in the urine of a patient affected with latent tuberculosis. It is possible to make an early diagnosis of tuberculosis or a diagnosis of latent tuberculosis from an investigation of the urine. It can be determined from an investigation of the urine whether or not a person affected with tuberculosis generates in his own organism protective substances, a condition of great importance in the prognosis.

Serum Treatment of Anthrax.—With the increase of our territorial possessions, it has become almost as necessary for us to watch for the occurrence of tropical diseases in our own homes as is the case with England. T. M. LEAKE (*Lancet*, March 25, 1905), his Majesty's Medical Inspector of Factories, reports that the treatment of anthrax has been conducted along three lines. The first was expectant, the second, by far the commonest, consisted in the removal of the pustules by surgical means or by cauterization and injection. The third, as practised notably in Italy and South America, consisted in the use of serum from immunized animals. In Jena the first method had been recently subjected to severe trial. Müller reports 13 consecutive cases in which nothing more than rest and the application of grey ointment was used. The average duration of treatment is sixteen days. Müller obtained excellent results, but

his conclusions, which contraindicate surgical intervention, are very sweeping. Legge has shown that the average mortality of the disease when treated by either the first or second methods was at least 25 per cent. The great objection to the use of the excision method is that the scar is often a very serious consideration. Scalvo, of Italy, has prepared an antitoxin which has been used very successfully by Lazeretti, of Siena, and by Cicognani, of Santa Croce. Of 67 cases, 56 were treated by serum alone. With the exception of the cases which terminated fatally, in every instance but one by the third day there was marked improvement, particularly in the arrest of the further development of the pustule and in the diminution of edema. There were two fatal cases. In the first, the patient was the subject of malaria was alcoholic and syphilitic. In 1903 Scalvo totalled 164 cases, with ten deaths, or less than 7 per cent., as compared with a total for the whole of Italy of 24.1 per cent. when treated by the usual methods. For the last eight months serum treatment has been used in England either with or without excision of the pustule. The claims of the serum treatment may be summarized as follows: (1) Even in very large doses it is innocuous. (2) It can be well borne, even when introduced into the veins. (3) No case taken in an early stage or of moderate severity is fatal if treated with serum. (4) With the serum some cases are saved when the condition is most critical and prognosis almost hopeless. (5) When injected into the veins the serum quickly arrests the extension of the edematous process so as to reduce notably the danger from suffocation which exists in many cases where the pustule is situated on the face or neck. (6) If used soon enough, it reduces to a minimum the destruction of the tissues at the site of the pustule. (7) In some situations of the pustule, as the eyelid, serum treatment must be used in preference to any other, as it alone can hold out hope of success without permanent injury; and to these may be added: (8) That in internal anthrax it is the only treatment which holds out any hope of benefit. In almost all cases injection of the serum is followed by a rise in temperature, often to over 105° F., and with it there is an improvement in the general health of the patient. In the same way the necrotic process itself is to be regarded as a sign that the organism is making effort to resist the anthrax infection. In the Pathological Institute at Siena, the serum is taken from asses which undergo immunization processes for about two years. Often more than fifty sera are taken at different times from the same animal. Three days after taking it, the clot having separated, the serum was decanted and ether to the extent of 3 per cent. of the whole bulk was added. Rabbits were then injected, and in thirty-six hours all the control animals were dead. They showed extensive edema at the point of inoculation, and anthrax bacilli were found in the blood at post-mortem. It would seem that the time had already come when anthrax would be considered as one of the few diseases which actually yield satisfactorily to serum treatment.

New Methods of Studying Affections of the Heart.—It appears that the sphygmograph has by no means been exhausted. JAMES MACKENZIE (*Brit. Med. Jour.*, March 11, 1905) endeavors to show in an interesting monograph that he has accumulated evidence that many signs are present if obtained correctly and interpreted in the light of recent progress that may profoundly modify our conception of many conditions of cardiac disease. He attacks the subject first from the standpoint of the function of the heart muscle fibers. These have been described as rhythmicity, excitability, contractility, conductivity and tonicity. By virtue of these adherent

functions, the heart is able to beat and keep up the circulation of blood independent of any nervous resistance. Arrhythmia may be due to affections of any one of these functions, either one affected independently of the other.

PATHOLOGY AND BACTERIOLOGY.

Preliminary Communication Regarding an Immune Body capable of Inhibiting the Development of Cancer in Mice (Adeno-Carcinoma, Jensen).—Preliminary investigations regarding the influence exerted by the serum of mice, which have recovered from experimental carcinomata, upon those is considered by CLOWES (*Bull. Johns Hopkins Hosp.*, April, 1905). The author's communication is based upon experiments upon mice by inoculating them with portions of living tissue received from Prof. Jensen, of Copenhagen. He did not in the course of his experiments observe any marked hereditary tendencies in the production of cancer. In some cases an exceptionally large percentage of tumors were obtained on inoculation of the offspring of mice that had themselves exhibited a considerable resistance to inoculation. In a number of mice inoculated spontaneous retrogression of the tumors occurred. A series of experiments were undertaken making use of both gray and white mice, having tumors varying from the size of a pea to that of large cherry. In every case two mice derived from the same source inoculated at the same time and having tumors of about the same size, were used for comparison, one receiving a dose of the blood obtained by killing one of the spontaneously recovered mice, the other receiving an equivalent dose of normal mouse blood. A marked effect was exerted by the immune serum on small tumors, three of which about the size of peas disappeared in four or five days, residues consisting almost entirely of connective tissue being all that was to be found on subsequent operation. A larger tumor, about the size of a cherry, treated in the same manner diminished considerably in size, became harder and remained stationary in its development, was removed successfully by operation, and had not recurred in the course of one month. Tumors weighing more than three or four grams were not appreciably affected by the serum, but the cachexia from which the mice suffer in the last stages were in all cases noticeably alleviated. The tumors in the control mice referred to above, which had received the normal serum were unaffected and developed in the usual manner, and eventually lead to the death of the animals. The serum of the mice cured of their tumors by the above treatment was found to possess a certain degree of activity, in one case causing the disappearance of a tumor as large as a buckshot in less than two days, but it can scarcely be said to have exhibited as great a degree of activity as did that which was obtained from certain spontaneously recovered mice. Experiments were carried out on twenty mice. Of those treated with repeated doses of the so-called serum one only has failed to show some effect which may be attributed to the serum, and all are still living. Of those treated with equivalent doses of normal serum, five are already dead and the remaining mice have tumors exceeding in size those of the mice for which they served as controls. A series of test tube experiments carried out to determine the nature of this serum makes it appear extremely improbable that it can be classed in the category of cytolytins. It does not exert a more marked hemolytic effect than does normal serum or the serum of a mouse dying of cancer. In general, it may be said that the changes found in the spontaneously cured tumors and in those inhibited or cured with the immune serum, correspond fairly closely to the changes already

described by several authors as indications of partial spontaneous recovery from human cancers.

Collecting Blood for Widal Test.—Very many methods have been suggested for collecting the blood necessary for the Widal test, if the examination cannot be made on the spot, but the majority are deficient in that it is impossible to accurately measure the amount withdrawn. An excellent device, which deserves popularity, is that of E. SCHOTTELIUS (*Münch. med. Woch.*, April 11, 1905). The apparatus consists of a small vial, whose stopper carries a needle around the free end of which a small amount of cotton is wound. The cotton is allowed to absorb the blood to be tested, after which the vial is tightly stoppered. Later, when the test is to be made, the vial is simply placed into a centrifuge, when the serum will be thrown to the bottom, while the clot remains in the sponge. Accurate dilution by means of a pipette is then possible.

Smokeless Powders.—C. F. KIEFFER (*Journal A. M. A.*, April 20) reports an investigation on the pathological effects of the fumes of the high explosive now so generally in use. A number of different powders were tested regarding the gases given out and the effects on the human system. The latter series was carried out in a room. Dr. Kieffer experimented on himself and on several members of the hospital corps by exploding a carefully measured quantity of the powder in a sealed room containing about twelve hundred feet of air space and observing the effects. The chief symptoms was the well-known "dynamite headache," and the fumes seemed to have marked effects on the circulation and heart, with secondary effects on the nervous system. In some cases there was incoordination and diminution of hearing and of vision. Low temperature seemed to aggravate the conditions, and at least one person was found who appeared to be immune. In most cases a certain amount of tolerance is gradually established. Kieffer also mentions a patient seen in the Da Costa's clinic who could take six hundred and fifty drops of *spiritus glonoini* without serious effects. According to his finding the gases to which the effects are attributed are carbonic oxid and nitrogen peroxid, especially the latter, though the symptoms are due to the combination of both. To meet the nitrite poisoning endeavor should be made to restore the vasomotor tonus, and strychnine is indicated in full doses. The carbonic oxid will be eliminated rapidly in moderate cases, but in severe intoxications oxygen inhalations and artificial respiration may be required. For the headache, coal-tar anodynes are not only useless, but dangerous. The best remedies are strong coffee and a linseed poultice to the nape, as advised by Key. The danger from these fumes is a real one, as numerous fatal cases testify.

OBSTETRICS AND GYNÉCOLOGY.

The Artificial Interruption of Pregnancy by Bougies.—To rehabilitate the method of bringing on labor by means of the introduction of bougies, which was largely advocated by Krause, is the avowed object of a paper lately published by JACOBY (*Arch. f. Gyn.*, Vol. 74, No. 2.). The paper is based on a series of 228 hospital cases, and the procedure employed is essentially as follows: The patient is given a cleansing bath and the outer genitals washed with soap and water, but the vagina is not disinfected. The cervix is then seized with one or two bullet forceps, and a bougie (diameter, 8 to 10 mm.) provided with a stilet, is gradually introduced while guided by the finger and the stilet slowly withdrawn. The bougie may be carried up between the bag of membranes and the uterine wall without any trouble. In 191 cases, one bougie

was sufficient, in 21, two were necessary, in 2, three, and in one, four. The average time before rupture of the membranes took place was twenty-four hours, to the completion of labor, 31.45 hours. The nearer the end of pregnancy the procedure was instituted, the more readily were labor pains elicited. The entire morbidity is stated by Jacoby to have been 6.8 per cent. in the 228 cases. Three cases of fatal issue may be ascribed to the employment of the method, two of these being sepsis, and one peritonitis. In the latter case the bougie failed and Cesarean section was resorted to. In 114 cases the pregnancy was interrupted for narrow pelvis, in 65 of these, labor came on spontaneously; in 49 artificial delivery was found necessary. Of these children, 65 per cent. lived. As the morbidity rate is not higher than that of institutions in general, the method may be looked upon as quite free from danger and affording a favorable outcome for the child. The simplicity of the method and the frequency with which the labor terminates naturally, makes it superior to the dilating bags, which practically mean the introduction of an accouchement forcé, or to vaginal section.

A Review of Recent Work in Obstetrics; Accouchement Forcé and Vaginal Cesarean Section.—Of the many methods that have been advocated recently, of dealing with the woman whose parturient canal is not fully opened up, but whose condition demands delivery within a definite time, W. E. FOTHERGILL (*The Practitioner*, April, 1905), carefully summarizes the different methods in use, and recommends certain systems which he considers to be of practical value. The methods available by which the uterus may be emptied artificially, rapidly, and without any muscular exertion on the part of the patient may be stated as: (1) Manual dilatation; (2) Branched metallic dilators; (3) Multiple incisions and vaginal Cesarean section. The nature of the indication for terminating pregnancy quickly has no influence upon the choice of the method to be used. This choice must be made with two things before the mind, viz., the speed with which it is necessary to deliver, and the state of the cervix. The author describes in detail the technic of each procedure. The method of manual dilatation as first described by Harris. While this method may be used in many cases where a more rapid means is not indicated it is open to the following objections: (1) It is more difficult to sterilize the hand than an instrument; (2) the work is excessively painful and fatiguing to the hand; (3) it often tears the cervix; (4) it cannot be begun until a finger and thumb can be got into the cervix; (5) it is too slow for some cases; and (6) in other cases it fails altogether. The writer advises that the process be conducted slowly, thirty minutes being suggested as a suitable time in most cases. The instruments advised by the author for rapid dilatation of the cervix are the mechanical dilators of the Bossi type and one designed recently by De Seigneux. The claims made by the advocates of metallic dilators, are: (1) It can be used even when the cervix is closed and unshortened, that is, before dilatation has begun; (2) the operator is sure of obtaining sufficient dilatation to allow of the delivery of a living child; (3) this can be secured, if necessary, in a short time—ten to fifteen minutes; (4) the use of the instrument excites uterine action; (5) dilatation up to 11 cm. (4 1/4 inches) can be secured without unduly stretching the vagina. The instrument of De Seigneux has the advantage of possessing a true pelvic curve and permits of more even dilatation. The method of allowing rapid dilatation of the cervix by multiple incisions, is that used by Duhr-

sen. Its indications are where there is partial dilatation and it is necessary to deliver without further loss of time. Under these conditions five or six incisions made into the cervix give access to the uterus more rapidly than any other way. The incisions may be conveniently stitched as soon as delivery is complete, in order to check bleeding and secure primary union.

The other method of rapidly emptying the uterus and which is receiving considerable attention consists in the so-called vaginal Cesarean section. This method was also brought into notice by Dührssen. By this method it is possible to empty the uterus in six or eight minutes. The author gives the indications for vaginal Cesarean section as follows: (a) In cancer of the cervix during pregnancy, the operation being followed by vaginal hysterectomy; (b)—(1) Abnormal conditions of the cervix and lower uterine segment (rigidity, fibroma, stenosis incarceration); (2) Dangerous states of the mother removed or relieved by prompt emptying of the uterus (heart, lung, and renal affections); (3) cases where death of the mother is imminent and can be foreseen. Thus there would appear to be room for vaginal Cesarean section amongst those cases which would dilate safely and easily enough were time no object. In other cases, where the saving of a few minutes may save the life of a mother or child, the operation would appear to be justified. Its other use is obviously in cases where dilatation is impossible owing to stenosis or malignant disease. Vaginal Cesarean section, in short, will tend to replace classical Cesarean section, except in cases of mechanical obstruction by bony pelvis or by tumors. It is clear that both accouchement forcé and vaginal Cesarean section demand a good operator, adequate assistance, and suitable surroundings.

Hepatic Insufficiency in Pregnancy.—J. CLIFTON EDGAR (*Journal A. M. A.*, April 8), comments on the mortality occurring during pregnancy, aside from known and preventable causes. He has examined the postmortem findings of women who have died during gestation from toxemia of pregnancy, and he insists on the importance of the study of the symptoms of this condition. Certain women have a predisposition to hepatic insufficiency and heredity should be considered. The excretions should be carefully examined, the mental state and nervous symptoms should be studied, and the possible periodic exacerbations should be looked for. If the symptoms of toxemia are found the examination should be still more detailed and thorough, and if the symptoms should indicate a progressive condition, with structural disease of the liver, the chances are against the patient. He discusses the interruption of pregnancy and the probability of an abnormal puerperium after pregnancy is successfully terminated. He concludes that the preventive treatment of much of the morbidity of pregnancy and of the puerperium depends on an early recognition of auto-toxemia as it shows itself in the clinical picture of hepatic insufficiency. No one of large experience can fail to observe that many pregnancies are really pathologic, and he thinks that the specific toxemia of the condition will soon be generally admitted. There may be more than one toxic condition, but, in any case, hepatic toxemia should be kept in mind. It is important that a woman in this condition should be kept under the observation of the physician.

Placental Emboli.—The clinical fact that primary chorio-epithelioma occurs in organs more or less remote from the placental site led G. SCHMOLL (*Centralb. für Gyn.*, No. 5, 1905) to investigate material obtained from autopsies of 150 women who died in the various

stages of gestation and the puerperal state. Placental emboli were found frequently in the lungs but actual deportation of chorionic villi within the pulmonary vessels was only observed in cases where there had been delay in labor with mechanical injury to the placenta from manual separation. In only two or three cases were there proliferative changes in the cells composing the placental emboli. In three cases of vesicular moles pulmonary emboli showed that cell proliferation was taking place. The conclusion is drawn from these studies that progressive changes occur only in cases where there is degeneration of the placenta from which the deported cells are derived.

A New Operation for Vaginal Cystocele.—The treatment of prolapse of the anterior vaginal wall has never been thoroughly satisfactory. Vaginal cystocele may be a bulging associated with uterine descent or from a hernia pushing down the vaginal wall while the uterus remains in proper position. The operations devised for the relief of this condition are essentially the same, and consist in removing a portion of the anterior vaginal wall and bringing the margins of the gap together. Such methods leave a scar for support and narrow the vaginal outlet. In the repair of hernia of the bladder, the true floor of the pelvis, which is formed by the levatores ani muscles, should be made to form the main support. The levatores ani muscles at their origin from the pubic bones are 2 cm. apart, at the center of the vaginal outlet 3 cm., at the central point of the perineum 4.5 cm. At these three points the lower border of the main muscle lies 1.5 cm., 2.5 cm. and 3.5 cm., respectively, below the surface. An operation suggested by E. W. H. GROVES (*Jour. Obstet. and Gynecol. of the British Empire*, March, 1905) is performed as follows: A transverse incision is made from one labium majus to the other 3 cm. behind the urethral orifice, dividing the whole thickness of the vagina. The urethra and bladder are separated from the vaginal wall and the margins of the levatores ani muscles brought into apposition with two or three mattress sutures. These sutures should be 1.5 cm. from the margins of the muscles, which should be united by fine interrupted catgut sutures. This procedure forms a median muscular mass about 2 cm. long and 1.5 cm. thick, lying beneath and supporting the base of the bladder. The margins of the vaginal incision are united with catgut after any redundancy in the vaginal wall has been removed. The superficial cicatrix may be kept clean by a light gauze packing, which should be changed every time the catheter is passed.

Extra-uterine Pregnancy at Full Term. Total Extirpation of Uterus and Placenta by a New Technique.—HIRSH N. VINEBERG (*Am. Med.*, April 8, 1905) reports an interesting case of abdominal pregnancy at full term. The patient had lost considerable flesh, had a decided cachectic appearance, and the pelvis was filled with a somewhat hard nodular mass which seemed continuous with the pelvic walls. Vineberg correctly diagnosed the condition on the strength of an enlarged empty uterus (corresponding in size to the tenth week of gravidity) and the presence of milk in the breasts. Vineberg first ligated the ovarian and uterine vessels on the free side, cutting the uterus across at the level of the os internum without making any attempt to separate it from the mass to which it was most intimately united, and then ligating the uterine artery on the involved side. In this way he cut off the main blood supply before making the attempt to enucleate the enormous placental mass. As a result of this procedure he was enabled to separate the placenta from its extensive attachments with comparatively slight hemorrhage.

The procedure also rendered the work of enucleation more easy by enabling the operator to work from below upward, as one would in enucleating an intraligamentous cyst when a similar technic is followed. In some of the cases reported in the literature preliminary ligation of the blood supply was carried out. This was done by ligating the ovarian vessels, and the uterine also when feasible, on the side of the placental site, but not in Vineberg's case, by first tying the vessels on the free side. He considers this step an important advance, and hence lays much stress upon it.

NEUROLOGY AND PSYCHIATRY.

Relation between Disease and Weight of the Brain.

—The possibility of being able to tell at autopsy, by purely gravimetric methods, whether or not the individual was the subject of cerebral disease, has been investigated by R. MITTENZWIG (*Allg. Ztsch. f. Psych.*, Vol. 62, Nos. 1 and 2), with the following results: In the male, without respect to age, a brain-weight of less than 1,000 grams indicates the existence of some cerebral disease during life. The diseases to be thought of are paralytic dementia, senile dementia, and if the individual was over sixty years old, an organic psychosis. If one is dealing with a case of one who was undoubtedly insane during life, then if the patient was less than sixty years old, a brain weight of less than 1,000 grams indicates, in all probability, a functional psychosis. In the female, less than sixty years of age, a brain weight of less than 1,000 grams is evidence of a dementia paralytica or an organic psychosis. If over sixty, and the weight of the brain is less than 950 grams, then one must think of a senile dementia or an organic psychosis.

The Calcium Content of the Infant's Brain and its Significance.—Two important observations were made by R. QUESTR (*Jahrb. f. Kinderheilk.*, March 1, 1905): (1) The calcium-content of the brain of the newborn is relatively high, and with the growth of the child it gradually diminishes, rapidly during the first few months and then gradually. (2) The brains of children that had tetany during life, in comparison with those of tetany-free children, show a smaller amount of calcium. The former observation is explained as follows: It has been shown that the cortex rich in cellular nuclei contains more calcium than the white substance of the brain. In the newborn the gray-substance has been developed more than the white matter, which only in the course of the first and second years is developed. The diminution of calcium with advancing age has, therefore, an anatomical basis. This higher content of calcium in the brain of the young animal may or may not be associated with the lessened degree of excitability observed in the cortex of the newborn animal.

Pathology of Sciatica.—J. RAMSAY HUNT (*Am. Med.*, April 15, 1905) records a typical case of sciatica with careful histological study of the affected nerve. To the naked eye the nerve trunk below the sciatic notch and in the popliteal space was swollen and distinctly enlarged. The swelling due to an accumulation in the perimol alveolar tissues of the translucent substance having the consistency of gelatine. A careful histological examination of the nerve by modern laboratory methods failed to reveal any structural changes of an inflammatory or degenerative nature. Hunt concludes that the so-called sciatica or more properly speaking sciatic perineuritis is not an inflammatory condition in the usual acceptance of the term. That the underlying change consists of a structureless transudate into the lymph

spaces of the nerve sheath of obscure nature and origin, but probably dependent upon or closely allied to the gouty and rheumatic diathesis.

PRESCRIPTION HINTS.

Asthma and Adrenalin.—According to M. Aronsohn, the painting of the mucous membrane of the nose with a solution of adrenalin (1-1,000) arrests an attack of asthma in a very few minutes. It does not cure asthma, but affords rapid relief. If it were not possible to employ the solution, the following ointment might be substituted:

R Sol. of adrenalin20 to 60 mm.
Lanolin1 dr.
Vaselin1 dr.

About the size of a pea is introduced into the nostrils.

Dilatation of the Stomach.—Dilatation of the stomach is no longer considered as a morbid entity, but rather as a secondary affection.

In case of excess of hydrochloric acid, the following powders taken every three or four hours, according to the intensity of the symptoms, produce a rapid improvement:

R Bicarb. of soda10 grs.
Calcined magnesia10 grs.
Sub. nitrate of bismuth5 grs.
Prepared chalk5 grs.

Against constipation M. Sanpanet advises a glass of the following artificial mineral water:

R Phosphate of soda1 dr.
Bicarb. of soda1 dr.
Sulphate of soda¼ dr.
Water1 quart

The laxative effects of this solution are very efficacious. The glass is taken fasting each morning for ten days in the month.

Ichthyol in the Vomiting of Pregnancy.—The persistent vomiting in pregnancy has been treated in divers manners, and numerous are the remedies prescribed to arrest it. The latest is that of ichthyol applied to the os, and which, according to some of my Paris confrères, acts like a charm. A mixture of glycerin and ichthyol (10 per cent.) is placed, by means of a plug of absorbent wool, in the vagina and in contact with the os. The remedy is simple and worth a trial.

Eczema of the Breast.—In no region is eczema more troublesome than that of the nipple and its aureola. It is accompanied with violent itching and oozing of serosity, which dries rapidly, forming soft and adherent crusts, which easily become detached, leaving a raw and bleeding surface. In a large number of cases treatment is slow to produce effects, and frequently it persists in spite of every means employed.

The treatment that has the best chance of success is that of extreme cleanliness. The parts should be washed with antiseptic soap, and a tannin lotion (1-100) applied as a spray. If, in spite of this treatment, crusts form, they should be removed with compresses of boiled water or poultices of starch or potato flour, made in a 3 per cent. solution of boric acid, and finally the following ointment applied once a day:

R Glycerin amyl1 oz.
Bicarb. of soda1 dr.
Cade. oil1 dr.
Lanoline1 oz.

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SYPHILIS AND ITS CAUSE.—A NEW OUTLOOK.

Of the scourges of the human race, three stand out with painful prominence—Tuberculosis, Syphilis and Carcinoma.

There is little doubt that they have existed for centuries, and in spite of our fondest hopes, they will probably continue to exercise their disastrous influence for many years to come.

A beginning has, however, been made. It is no fanciful mirage of the dreamer that sees the ultimate passing of the White Plague. The *Bacillus tuberculosis* will some day be relegated to the museum shelves, as a specimen of an extinct species. It will not be in our day, nor in the generation of our children's children, but the veil of secrecy has been removed and the problems of prevention promise ultimate solution.

We are absolutely in the dark on the problem of carcinoma, but some recent light has come that offers much toward the solution of the etiological factor in syphilis. Promising contributions come from a number of sources and we are pleased to present to our readers, Page 1145, a confirmatory note from Drs. Flexner and Noguchi that makes us feel that a great step forward is now possible.

Some two or three years ago we learn that Bordet and Gengou observed in the plasma of a

syphilitic chancre a spiral micro-organism, but failing to subsequently confirm their findings, nothing was said concerning it. Recently, however, as outlined by Flexner and Noguchi, a number of observers have substantiated the finding of a spiral bacterium brought into prominence by Schaudinn and Hoffmann and named by them *Spirochaeta pallida*. The corroboration by Metchnikoff and Roux, in their artificial syphilides in apes, and the present confirmation by the workers in the Rockefeller Institute, makes it appear that a new micro-organism has been found and that it is possible that it may prove to be the specific organism of syphilis.

While it is premature to maintain *Spirochaeta pallida* as the cause of syphilis it might be of interest to bring to mind that this genus offers us some interesting pathogenic species, notably the *Spirochaeta Obermeieri* of Relapsing Fever and also *Spirochaeta anserina*, an infectious disease of geese. It may be further recalled that *Spirochaeta Obermeieri* is not infectious for the lower animals with the exception of the small-nosed (*Catarrhine*) monkeys, a significant detail in view of Metchnikoff and Roux's findings.

Compared with the *Spirochaeta* of relapsing fever the present organism would seem to resemble it fairly closely—*Spirochaeta Obermeieri* varying from two to six mikrons in length and showing three to five spirals—*Spirochaeta pallida* being four to ten mikrons in length and showing three to twelve spirals. The motility in both is marked.

Inasmuch as great difficulties have been encountered in the culture of *Spirochaeta Obermeieri* the problem is by no means solved even should it be shown that the new organism bears any relation to syphilis. It may be borne in mind, however, that Koch spent years in devising a technic to cultivate the tubercle bacillus, a task not impossible now to many a comparatively untrained bacteriologist.

We hope for further observations and will await with considerable interest the results of workers in bacteriology the world over. Should the organism really have been secured, the problem of therapeutic possibilities becomes definitely promising.

THE RELATION OF THE PANCREAS TO THE METABOLISM OF FATS.

THE conviction has gradually shaped itself in the minds of physiologist, pathologist, and clinician, that the digestive functions of the pancreas

represent, after all, but a small part of the physiological efficiency of this organ. Indeed, when viewed in the light of the most recent investigation, the digestive rôle of the pancreas is relatively insignificant beside its larger sphere in the metabolic events of the organism.

The researches in the internal secretion of the pancreas have occupied themselves mainly with its bearing on the metabolism of sugar. The diabetes resulting from disease or deprivation of the pancreas has been attributed to a failure in the oxidation of sugar by the body, and it has been assumed that the pancreas provides a ferment which renders this oxidation possible. Yet glycosuria is not the only way in which diabetes expresses itself. There occur in this disease more profound and comprehensive derangements in the general nutritional exchanges of the body than the mere interference with the metabolism of sugar. To what extent the pancreas is related to the oxidation of the proteids and fats is a problem that has appealed strongly to careful investigators.

For the past three years, Dr. U. Lombroso, of the Laboratory of General Pathology of the University of Turin, has been engaged in a study of various phases of the pancreatic function, and his results have appeared from time to time in a series of eighteen articles in various Italian journals. These are now for the first time summarized in *Archives Ital. de Biol.*, January 28, 1905. Representing a connected series of investigations aiming at the discovery of the obscure functions of the pancreas, this recapitulation merits careful discussion, for the results cannot fail to have an important bearing on the clinical aspects of the subject.

It was found at the outset that ligation in section of the pancreatic duct does not produce any profound interference with intestinal digestion, and hence does not seriously diminish the amount of food capable of absorption. This is explained by the fact that the saliva and the intestinal juice are both active agents in the hydrolysis of the starch, while the latter secretion has a marked lipolytic activity, although this is inferior to that of the pancreatic juice.

Although ligation of the pancreatic duct does not compromise the digestive powers in the small intestine, yet if the same pancreas whose secretion has thus been cut off or deflected from its usual destination be entirely removed, there results an immediate impairment of intestinal digestion. This is shown in the fact that the feces

contain an amount of fat equal to that which has been ingested, as well as large quantities of carbohydrates and proteids. This is easily explained on the basis of an absence of the proper secretion of the pancreas from the intestine, but renders all the more puzzling the negative results following ligation of the pancreatic duct. It appears as if the presence of the pancreas in the body, whether or not its duct be tied, is an indispensable condition for the absorption of foods. This points to the pancreas as the seat of an internal secretion whose function might be compared to that of the external secretion, in maintaining the absorptive integrity of the small intestine.

Ligation of the duct of Wirsung does not cause any histological changes in the pancreas. From this fact it is concluded that under these circumstances the organ continues to elaborate its secretion, which, unable to pass out, is reabsorbed, and unfolds its activity in some mysterious way in the organism.

The most interesting stage in these investigations was reached when the author sought to discover the influence of the pancreas on the metabolism of fats. He found that the fatty stools that occur after ablation of the pancreas are not the result of an absence of lipolysis in the digestive tube, for the administration of fatty acids or of soaps to the animal leads to no diminution in the amount of fat contained in the feces. In fact, in certain dogs deprived of the pancreas, the author has observed an elimination of fats which exceeded in amount that which had been introduced by the mouth. The author believes that even in the absence of the pancreas there is an absorption of fat from the food canal, in spite of the fact that the stools show the same amount of fat as that which has been ingested. He attributes this apparent paradox to the fact that there is an excretion of fat into the lumen of the intestine. This supposition is confirmed by the discovery that if the animal be fed with fats having a low fusion-point, there will be found in the feces fats having a fusion-point which is much higher. This observation shows that the fats in the feces are not entirely derived from the food, and that although the amount of fat found in the feces may equal that taken in by the mouth, this fact does not exclude the possibility of an absorption of fat from the intestine. The fatty stools must, therefore, be attributed not to a failure in the digestion and hence in the absorption of fats, but should rather lead to the

suspicion that the absence of the pancreas in some way disturbs the fatty metabolism of the body, and consequently causes an elimination of fat into the intestinal lumen.

In animals dying at some time subsequent to removal of the pancreas, there is observed in various organs a copious infiltration of fat. This is all the more remarkable, in view of the diminution of the absorptive capacities of the intestine. Again, in animals deprived of the pancreas and then subjected to starvation, the resulting diminution of weight is attributed to a destruction of the proteids of the body, as shown by the nitrogenous content of the urine. These facts indicate to Lombroso that in animals without a pancreas, the power of burning up the fats of the body is diminished. The copious elimination of fats observed in these animals shows that the organism tries to get rid of a substance which it cannot easily utilize.

This interference with the consumption of fats which occurs after removal of the pancreas, probably also occurs in certain diseased conditions of this organ. One may here allude to that form of diabetes associated with obesity. Since in many, if not the majority of cases, diabetes is due to disease of the pancreas, particularly of the islands of Langerhans, it can readily be understood how this pathological process can interfere with two important functions of the pancreas, namely, glycolysis and adipolysis. The association of diabetes and obesity can thus be easily explained.

THE ECONOMICS OF MEDICINE.

THE *British Medical Journal* for Saturday, June 3, is devoted to a comprehensive and detailed résumé of the conditions involved in the practice of medicine throughout much of the civilized world. Of all the various phases discussed none is perhaps more really significant than that which concerns the economic aspect. With absolute unanimity reports from the various countries show a deplorable disproportion between the expenditure of time and capital and the resultant income. In most of the European countries a practitioner with an income of from \$1,200 to \$2,400 is considered rather fortunate.

If one were permitted to judge of the civilization of a country by the remuneration of its physicians, Denmark must carry off the palm with a yearly income for the average practitioner ranging from \$1,400 to \$2,800; on this basis also Spain lives up to her reputation for

decadence since incomes as low as \$200 are not uncommon, and of the 1,000 doctors practising in Madrid, "800 find it difficult to live."

Between these two extremes range the other countries mentioned. In Austria the average medical man is able to earn a livelihood, but cannot save anything for his old age. In Hungary matters are slightly better, the country practitioner being able to lay aside a trifle for his old age, except in the poorer mountain districts, where the physician is obliged to combine some other calling with his profession in order to live. In the towns also the fees are very low, being governed by fixed yearly sums from families to cover all necessary attendance. In Italy we find rather peculiar conditions dictated by the social restrictions of that ancient country. There is no "professional class" as we understand it. Both medicine and law are in the hands mainly of men without the distinction of birth which admits to "society," and only those of special renown can overcome this handicap. Under these circumstances it is not strange that the income of the *medici condotti* is less than \$500. The Hollander who adopts the medical profession must be satisfied with about \$1,200, unless he wins special eminence. The report on Turkey gives no estimate of yearly earnings, but the average fee is about 75 cents per visit, and "the conditions of general practice for foreign graduates are not attractive unless attached to some embassy, legation, hospital or board of health." Medical etiquette is practically unknown, and the national reputation for bad debts and reactionary policy is supported by individual instances. In Bulgaria the fees are low, and as in the poorer parts of Hungary, the physician adopts some additional means of livelihood. In Servia \$700 appears to be an average income, and a like condition of affairs exists in Roumania.

In the British colonies on this side of the Atlantic the wage-earning capacity of the average medical man is estimated at \$1,500, but it must be considered that the economic relation is practically unchanged. As a whole there is nothing in any of these reports to invalidate the assertion of universal underpayment.

Although matters in the United States are not so serious as in Spain, nevertheless the profession here is sufficiently underpaid to sympathize actively with its brethren in the Iberian peninsula, and to feel an interest in tracing the causes and effects of the existing state of affairs.

In considering the etiology of the conditions, there are certain factors which we find universally accused. Conspicuous among them are the overcrowding of the profession and the growth of the contract system.

The former is obvious in our own country, and has not as yet proved self-limiting. Possibly this defect might be in a measure remedied if the ideas of Dr. Osler were carried out, and the numberless small medical schools replaced by a more concentrated system with complete reciprocity between the various States.

The evils of the contract system are not yet so particularly menacing in the United States, although a nucleus has been imported with the foreign population. It is easily seen, however, what disasters follow its exaggerated development in Europe. In Austria, for instance, the Krankenkassen or clubs established by law, have brought the profession "to the verge of ruin." In Holland in addition to the ordinary abuses there is a special one resulting from the existence of clubs maintained by undertakers in large towns. In Denmark the Friendly Societies, which are very numerous and strongly supported by the State, have very considerably reduced the income of the practitioner. In Germany more than a quarter of the whole population share in the benefits of free medical attendance. If, under this contract system, the doctors were adequately paid the evil would not be so pronounced, but the remuneration is invariably a mere pittance, and the work generally most exacting. For instance, in Portugal the fee for attendance is frequently as low as five or ten cents. For an illustration of the work demanded we need not go so far afield. In this country, where trade societies, by force of circumstances, generally employ one of the younger men, who is constrained by his necessities to seek such a position, the "club doctor" is subjected to endless harassing and annoying demands, summoned at midnight at the bidding of some patient suffering from a trivial ailment or mere caprice. Why not? "It doesn't cost anything."

In Belgium the benefit societies exhibit this evil in an aggravated form, and in addition we find active in that country a third element in the situation which is also prominent in our own land. We allude to the abuse of free medical aid by such persons as are abundantly able to pay for it. By the terms of the Belgian law of

Public Assistance, aid is given to indigent persons by the commune in which they happen to be. In some communes leading inhabitants are not ashamed to inscribe themselves on the roll of paupers so that they may claim gratuitous attendance from the doctor who is paid a merely nominal fee by the authorities. This same disposition is manifested in America by those who, in defiance of the law, abuse the privileges of dispensary and clinic intended for the really needy. We are all familiar with the tales of the dispensary doctor who finds among his patients the lady in sealskin and diamonds and the man whose victoria awaits him a block away. This abuse, widely prevalent and shameless, works injustice both to the physician, who should be paid for attending such people, and to the actually poor, who are deprived of the time and attention intended for them.

To be sure this evil is confined to the cities, but the rural districts have their own difficulties for the practitioner, in their tendency to too great a reliance upon household remedies, and a susceptibility to the alluring devices of the patent medicine even greater than that of their fellows in the city.

In close alliance with the patent medicine scourge we find a vast army of quacks of various persuasions, preying upon the credulity of an unenlightened public, ensnared by unlimited promises and spectacular methods. The money which is annually diverted to the coffers of these unscrupulous traffickers would, if directed to its legitimate channel, raise the average of the physician's income to a figure in keeping with the dignity and arduousness of his profession. Under the present circumstances, however, the temptations to depart for the sake of gain from the straight and narrow path of professional probity are such that the ranks of the quacks are materially recruited from among the weaker brethren of the profession itself. Thus a vicious circle is established in which quackery alternately plays the part of cause and effect.

Finally, it has become a matter of proverbial allusion that "the doctor is the last man paid," and any professional information which can be casually extracted in conversation either in person or by telephone, is looked upon as so much free loot.

Thus we see some of the causes which produce, in this country and elsewhere, the condition reported. The tracing out of the results of this

condition would imply more space than is at our disposal. Suffice it to say that in their ultimate consequences they must entail disaster not only upon the profession, but upon the public at large.

ECHOES AND NEWS.

NEW YORK.

Physician Delegate to Peace Conference.—Dr. Frederic Griffith has been appointed a member of the International Peace Conference, to be held in Lucerne, Switzerland. Dr. Griffith attends as the accredited agent of the Pennsylvania State Society.

Death from Yellow Fever.—Frank O'Leary, of Buffalo, announced in last week's News as a suspect, died at the Government hospital, on Swinbourne Island, last week, of yellow fever. He was taken ill on board the steamer Seguranca, while on the way from Colon to this city, and was transferred to the hospital upon the steamer's arrival, June 7.

Flower Mission Open for the Season.—The New York Flower Mission, at No. 104 East Twentieth Street, is open every Monday and Thursday (for the thirty-fifth season) for the reception of flowers, fruit, and delicacies for hospital and tenement house sick. An increased supply of fresh flowers, especially fragrant ones, is greatly needed, and as the express companies bring them free, it is earnestly hoped that people in the country will remember the distress of their poorer city neighbors who are sick. Women staying in town are requested to assist at the rooms in tying up bouquets and distributing them in hospitals.

Hospital Managers Named.—Governor Higgins, prior to his departure for Duluth, decided upon the appointments of managers of the State hospitals for the insane, which, under the Allds law, passed by the legislature recently, succeeds the board of visitation of these institutions. The restoration of boards of managers marks the culmination of the fight of the charitable interests of the State against the Odell legislation of 1902, which put them out of office and centralized all power over the insane hospitals in the State Lunacy Commission. The Allds law provides for a cooperation in supervision and management of these institutions between these boards and the Lunacy Commission, the power of appointment of superintendents and stewards and other matters of administration being vested in boards of managers, subject to the confirmation of the Lunacy Commission. The appointments are as follows: Central Islip—Edmond J. Butler, Mrs. Augustus Floyd, Henry P. Hollister, Mrs. William Robison, Leopold Sondheim, William M. V. Hoffman, James MacGregor Smith.

Kings Park—John Thatcher, Julian D. Fairchild, the Hon. John Rooney, Mrs. M. S. Ackerly, Mrs. F. B. Pratt, Walter Jennings, Silas B. Dutcher.

Long Island—Miss Louisa Mann Wingate, the Rev. William J. White, Mrs. John H. Burtis, Norman S. Dike, the Hon. Charles A. Schieren, Alexander E. Orr.

Manhattan—Mrs. Francis Kinnicutt, Isaac N. Seligman, Mrs. Grace Gillette Bird, Whitman V. White, Thomas M. Mulry, Cleveland H. Dodge, the Hon. Seth Low.

In the Middletown board are the names of Mrs. Anson R. Flower and Mrs. Robert Sturgis, of New York.

Stony Wold Sanatorium.—As the fourth annual report of the Stony Wold Sanatorium, for the cure of consumptives, covers the first full years with the plant in working order, it is especially indicative of the work, writes the *Evening Post*, that can be carried on there in the future, when the most pressing needs of the sanatorium have been provided for. The reception of patients was formally begun on October 1, 1903. Since that date one hundred and thirty-one women, girls and children have been cared for. Of these six did not improve while at the sanatorium, and returned home to die. On January 1, 1905, fifty-five patients were under treatment. As far as the records show, sixty-eight of those discharged were sufficiently recovered to resume their places in their homes, or as wage-earners. Two have been received at other sanatoriums. In regard to the care of the patients, the report reads: It is impossible to predict the progress of a given case. The constitution and reparative powers are often so undermined that, in spite of the utmost caution, the patient retrogrades because there is no physical foundation on which to build. If it were possible to effect in three months what it usually takes six months or a year to accomplish, the total number of cases treated would be much larger. Our success must always be conditioned on the stage of the disease. There is another reason why tuberculosis is difficult to control. It is an established fact that it is communicable, and out of the stress that has been laid on this point has been wrought a hardship for the patient. Families endeavor to conceal the fact that one of their number is a victim of the malady, because, as a result of the urgency of the message of science, the consumptive believes that a ban is placed upon him, and that he is henceforth designated a menace to the community. It is only the ignorant and careless who are in danger in public places. Beside its value for care and cure of tuberculosis patients, Stony Wold might appropriately be called a training-school. As the report points out, "it is no small thing to have dismissed during the year seventy missionaries of hygiene and healthful methods of living. The influence of that member of a family who, as an inmate of Stony Wold, has learned to place the proper value on air and sunlight, on a wholesome diet, on cleanly habits, changes that home from a danger spot to a center from which emanates that knowledge which is of supreme importance in helping to solve a problem of vast magnitude."

The needs of Stony Wold are still many, as enumerated in the report: Foremost among our needs is a cow barn and cows, so that we may have pure milk. At present we procure the milk and cream used from a local dealer at 5½ cents per quart. This price is reasonable, and we do not expect to reduce it greatly, even with our own stock, but it is universally agreed at the present time that sanitary buildings, clean cows, and careful service are necessary for the production of wholesome milk, a most important factor in the diet of the tuberculous patient. We use, on an average, one hundred quarts a day, and need fully twenty quarts more a day. In December last our records show a consumption of 3,286 quarts for the month. A great need at the present time is that of a new engine for our naphtha launch. The hull of the boat is perfectly sound, but the engine in it is worn out. This had been in use several years when the launch was given to us. The boat is needed in order to enable us to meet passengers who reach Kushaquia on the Delaware and Hudson

railroad, which runs through our property on the opposite side of the lake. It is also needed in order to afford recreation for patients. Seven dollars a week will keep a patient at Stony Wold, including transportation, special diet, and all other extras. Children sent there are regularly taught, as though they were in one of the public schools.

Hospital List Announced.—The authorities of the College of Physicians and Surgeons, the medical department of Columbia University, to-day made public the complete list of seniors who have obtained appointments at hospitals in the spring competitive examinations. Out of a class numbering about one hundred and eighty, when it graduates next Wednesday, more than one hundred men, or about sixty per cent., have "made" hospitals. The list includes not only every important local institution, but a great many out-of-town hospitals as well. The national character of the school is shown by the fact that Columbia, Yale, Harvard, Princeton, Dartmouth, New York University, the Massachusetts Agricultural College, the New York City College, Rutgers, and the Kentucky State College are a few of the institutions of learning represented in the list, which is as follows:

Bellevue Hospital, Fourth Division—Ralph Ryan, Yale; J. C. Mabey, George B. Emory, Harvard.

Bellevue Hospital, P. and S. Division—Davenport White, Yale; Everett M. Howks, Columbia; Edgar B. Armstrong, Gordon Lindsay, Columbia; Charles J. Harbeck, Harvard; Murney E. Lewis, alternate, John F. Bourke.

Beth Israel Hospital—Albert C. Margulies, Samuel J. Goldfarb; externes, Julius L. Moguleoko, Martin Kutscher.

Brooklyn Hospital—John A. Bennett, William S. Smith, R. N. Prentiss.

Bushwick Hospital, Brooklyn—Henry M. Friedman.

City Hospital, Blackwell's Island—Charles S. Boyd, Harrison S. Martland, Western Maryland College; P. Clinton Pumyea, Princeton; Joseph D. Slack.

Columbia Hospital—Eugene P. Schaefer, John D. Gaskins.

Englewood Hospital, Englewood, N. J.—Philip E. Brundage, Princeton.

French Hospital—Malcolm E. Smith, Charles Krumwiede, Jr.; Lester F. Meloney; alternate, V. James Orlando.

General Memorial Hospital—Robert H. Hutchinson, Jr.

German Hospital—Reuben Ottenberg, Columbia; Alfred H. Noehren, City College; Alfred M. Hellman, Columbia; substitute, David J. Kaliski.

German Hospital, Brooklyn—Julius J. Valentine.

Hale Hospital, Haverhill, Mass.—Stafford B. Smith.

Harlem Hospital—Mason D. Bryant.

Hospital for the Ruptured and Crippled—Pietro Fiaschi.

Hudson Street Hospital—George A. Merrill, City College; Charles T. Leslie, Massachusetts Agricultural College; M. D. Bryant.

Jamaica Hospital, Jamaica, L. I.—Martin T. Powers, Louis V. Clarke.

J. Hood Wright Memorial Hospital—Frank D. Solley, Robert Cordner, College of Pharmacy; alternate, Joseph Z. McDermott.

Kings County Hospital—Henry F. Graham, Allen C. Hutcheson, University of Virginia.

Lincoln Hospital—Walter R. Terry, Wesleyan; Robert A. Adams, City College.

Methodist Episcopal Hospital, Brooklyn—Henry F. Grahamp, A. C. Hutcheson.

Monmouth Memorial Hospital, Long Branch, N. J.—J. Z. McDermott.

Mt. Sinai Hospital—Internes, Harold M. Hays, Columbia; Harold Neuhoof, John C. A. Gerster, Columbia; A. R. Chamberlain, Yale; L. G. Kempfer, Walter J. Heiman, Columbia; Robert W. Pettit, Rutgers; Jacob Wisansky, City College; externes, Isidore Rubin, Abraham E. Jaffin, Abraham Hyman; provisional, Max Schayer.

Newark City Hospital, Newark, N. J.—Joseph J. Smith; alternate, Samuel W. Dodd, Princeton.

New York Hospital—Norman S. Shenstone, Toronto University; George F. Cottle, City College; Frederick H. Bartlett, Harvard; Walter B. Mount, Princeton.

Norwegian Hospital, Brooklyn—Hans G. Baumgard, New York University; Jefferson B. Latta.

Orange Memorial Hospital, Orange, N. J.—Charles L. Allers.

Paterson General Hospital, Paterson, N. J.—Orville R. Hagen.

Post Graduate Hospital—Irving W. Voorhees, Princeton.

Roosevelt Hospital—Kirby Dwight, Princeton; Clarence W. Bartow, Columbia; Edward A. Park, Yale; Marius E. Johnston, Kentucky State College; Raynam Townshend, Yale; Robert M. Brown, Harvard; Edward M. Cole, Jr., Columbia.

St. Barnabas' Hospital, Newark, N. J.—Ross E. Black, Harold W. Wright.

St. Catherine's Hospital, Brooklyn—Sylvester E. Ryan.

St. Francis Hospital—Charles I. Prescott, Dartmouth; W. W. St. John, Conrad F. Kurpeck, St. Peter's College; Francis M. Dickinson, Yale.

St. John's Riverside Hospital, Yonkers, N. Y.—Harry H. Stevens, College of Pharmacy; Henry E. Ricketts.

St. Joseph's Hospital, Paterson, N. J.—William J. Tiffany, Frank Y. Neer.

St. Luke's Hospital—Harry S. Holland, Columbia; P. H. Hayes, Milne B. Swift, Arthur L. Hutton.

St. Mary's Hospital, Brooklyn—Eugene J. Cronin, Leo A. Parker, Rock Hill College; Francis B. Hart.

St. Mary's Hospital, Rochester, N. Y.—George C. Driscoll.

St. Vincent's Hospital—William J. O'Leary, John S. Brady, Georgetown; Charles M. Quinn, Arthur F. McDonald, David Corcoran.

Swedish Hospital, Brooklyn—H. F. Brunning.

Sydenham Hospital—Avrum H. Zeller; alternates, Max Volk, Louis Cohen.

Williamsburgh Hospital—Thomas C. McCoy; alternate, Leo Wertheim.

PHILADELPHIA.

Prison Inspectors Elected.—The members of the Board of Prison Inspectors, to serve for one year from the first Monday in July, were elected by the Board of Judges. The only new member is Dr. J. M. Reeves, of 1525 Spruce Street, who will take the place of Dr. Morris S. French, the latter having removed to Virginia.

Successful Lawn Fete.—The recent lawn festival and bazaar, held at the Lindenhurst, the country seat of John Wanamaker, for the benefit of the Jefferson Maternity, must be considered a success.

financially as well as socially. After making up the accounts, the managers of the affair are able to turn over to the treasurer of the Maternity \$3,000.

Rabies Prevalent West of the Schuylkill.—The residents of the district lying west of the Schuylkill River are very much exercised over the prevalence of hydrophobia. It is stated that since the first of May, 1905, more than fifty dogs have shown symptoms of the disease. A number of animals have been and are being treated with Pasteur's antitoxin at the Veterinary Hospital of the University.

Doctors of 1880 Hold Reunion.—The annual reunion and banquet of the medical class of 1880 of the University of Pennsylvania was held at the Bellevue-Stratford last Tuesday night. Of the 116 graduates 21 have died and only 32 were present. Dr. Edmund W. Holmes was toastmaster. Toasts were responded to by Dr. Joseph S. Gibb, Professor James Tyson, Professor B. Alexander Randall, Dr. Lewis H. Taylor, Dr. Henry R. Price, Dr. Charles A. Currie and Dr. Bernard Berens.

Philadelphia Pathological Society.—At the regular meeting of this society, held June 8, 1905, the scientific program was opened by Drs. J. D. Steele and W. R. Butt, who read a paper on "The Tests for Occult Blood in the Feces." The next paper was read by Drs. D. L. Edsall and C. A. Fife, on the "Influence of the X-ray on the Metabolism in Gout." Dr. D. L. Edsall also read a paper on "Milky Non-fatty Effusion in Hodgkin's Disease." Dr. W. E. Robertson showed specimens from the same case. Dr. D. Riesman showed "Specimens from a Case of Hemorrhagic Infiltration of the Kidneys in the New-born." The last paper was read by Dr. G. P. Müller, on "Sarcoma of a Metatarsal Bone."

Philadelphia Academy of Surgery.—This society met June 5, and the following papers were presented: By Dr. John H. Jackson, "A Case of Fracture, Illustrating the Use of Halsted's Splint." He showed a patient suffering with a fracture of the tibia. This paper was discussed by Drs. Harte and Roberts. Dr. James Young reported "A Case of Complete Functional Laminectomy for Fracture of the Vertebra." He showed a patient who recovered from paralysis due to dislocation of the shoulder at birth. Dr. John B. Deaver read a report of "The Operations Performed Before the Students at the German Hospital During the Season 1904 and 1905." He laid particular stress on the technic of the operations and the methods employed by the nurses. Dr. George M. Dorrance, by invitation, reported "A Spiral Fracture of the Humerus, Caused by Jiu Jitsu." He showed the patient.

Residents Object to Placing Consumptive Sanitarium Near Their Homes.—During the latter part of last week Judge Beittler began the hearing of the complaining residents of North Mt. Airy against Mrs. Margaret C. O'Hara's sanitarium for the open-air treatment of tuberculosis. The sanitarium consists of a number of canvas tents, which are occupied by tuberculous patients. The residents complain that the patients can be heard coughing and expectorating, and that the management shows an utter lack of propriety in allowing the patients to go about the tents clad in night robes only. The operation of the laundry day and night, the going to and fro of many nurses and servants, and the constant arrival and departure of milk wagons, make the sanitarium appear more like a busy industrial establishment rather than a hospital, and since the neighborhood is strictly residential, the sanitarium is objectionable not only for the reasons given, but also

because it is a menace to the health of the residents.

Inspection of Public Schools.—According to the reports submitted to the Board of Health, the inspection of the public schools by physicians has resulted in much good for both the public and the pupils. The medical examiners have made 26,131 visits, and have examined 111,100 children during the first year. Of the last mentioned number 18,528 had been set aside by the principals as suspicious cases of probable transmissible disease. Because of disease 4,124 pupils were excluded from school, and 901 unvaccinated pupils were detected and vaccination enforced in every instance. The most common disease found was defective vision. Many of the children, who were thought to be stupid and backward, and who could not see words or figures on the blackboard, when given suitable glasses, were found to be as intelligent as most children of their class. This work of inspection was first undertaken one year ago, at the solicitation and under the supervision of Dr. Edward Martin, Director of Public Health and Charities.

Health Commissioner Appointed.—Dr. Samuel C. Dixon, president of the Academy of Natural Sciences, was appointed Commissioner of Health by Governor Pennypacker. The position was created by the last legislature, which body passed a bill providing for a Department of Health, to take the place of the State Board of Health. The Department of Health, over which Dr. Dixon is to preside, consists of an advisory board of six members, four of whom are to be physicians. They are not salaried, but may collect expenses incurred while discharging their duties of office. According to the provisions, the State is to be divided into ten districts, each of which is to be in charge of a physician, whose salary shall be \$2,500. The commissioner is invested with authority to issue subpoenas to secure the attendance of witnesses, and to issue warrants for the apprehension of violators of the health law. He may revoke or modify any regulation, by-law or ordinance of a local board of health, which regulation, by-law or ordinance may effect the public health beyond the territory over which the local board has jurisdiction.

CHICAGO.

Election of Dr. Norbury.—Dr. Frank P. Norbury, of Jacksonville, Ill., has been elected Professor of Nervous and Mental Diseases in the Keokuk Medical College.

Bill for Nurses Vetted.—The bill for an act to establish a State board of examiners for registered nurses was recently vetoed by the Governor. An analysis of the veto shows that the bill conferred special privileges on graduates of certain training schools, and that hardships were imposed on many well-qualified and experienced nurses now in practice.

Officers of Physicians' Club.—The annual meeting of the club was held May 23, when the following officers were elected for the ensuing year: Secretary, Dr. Chas. L. Mix. Drs. Clarence A. Earle, Henry F. Lewis and Arthur M. Corwin were elected Directors. The policy of holding irregular meetings will be continued. A chairman is elected at each meeting.

Commencement Exercises of the College of Physicians and Surgeons.—The twenty-third annual commencement exercises of this institution were held June 6, when a class of 213 was graduated, 13

of whom were women. Four of these appear on the honor list. The doctorate address was delivered by Rev. William A. Quayle, and the degrees were conferred by Prof. T. J. Burrill, vice-president of the University of Illinois.

Changes at Rush Medical College.—An official statement was recently issued concerning the work of Dr. Nicholas Senn and Dr. John B. Murphy, in this institution. The statement says: "Dr. Nicholas Senn remains at the head of the surgical department of Rush Medical College, and will have entire charge of the clinical teaching of surgery during the fall quarter. Dr. Senn has also been elected Professor of Surgery in the University of Chicago, and will lecture to the medical class. Dr. John B. Murphy has been elected Professor of Surgery in Rush Medical College, and, with Dr. Arthur Dean Bevan, will have charge of the administrative details of the department of surgery and will conduct the clinical teaching of surgery during the remainder of the year."

CANADA.

News Items.—Dr. J. Algernon Temple, of Toronto, formerly Dean of Trinity Medical College, has had conferred upon him the honorary title of LL.D. by the University of Toronto.

Dr. Lewellys Francis Barker, of Baltimore, received the honorary degree of M.D. at the convocation exercises of Toronto University, on May 9.

The Hon. Dr. Robert Allan Pyne, Minister of Education for the Province of Ontario and Registrar of the Ontario Medical Council, has had conferred on him LL.D. by the University of Toronto.

The Medical Department of Queen's University, Kingston, Ont., will seek financial aid from the Ontario Government in the autumn, when a deputation from that university will wait upon the Government.

Dr. Ernest K. Cullen, house surgeon in the Toronto General Hospital, and a brother of Dr. Thos. S. Cullen, of Baltimore, has been appointed a Fellow in Pathology at Johns Hopkins Hospital University.

Hospital Superintendent Banqueted.—Dr. Charles O'Reilly, for over twenty-nine years medical superintendent of the Toronto General Hospital, having resigned from that position, was, on the evening of June 10, banqueted by the profession of Toronto and surrounding country. The occasion was a splendid testimonial to the capability of a man who had so long administered the affairs of the largest hospital in Canada. A large number of Dr. O'Reilly's house surgeons of former years were present, Drs. Barker and Cullen coming up from Baltimore. Every section of the province of Ontario was represented. Dr. John S. King, Toronto, gave some very interesting and funny citations of the time when he was Dr. O'Reilly's first house surgeon in 1876, and the only one. Among others who spoke were Drs. J. F. W. Ross, Dr. Thos. S. Cullen, Dr. L. F. Barker, Dr. Breffney O'Reilly (son), Dr. Gerald O'Reilly (brother), Guelph, and Dr. J. Algernon Temple and Dr. Allen Baines, the former of whom proposed the toasts to Dr. O'Reilly, recalling the time when they were students at McGill University, forty years ago, the latter (Dr. Baines) reading an address and making a presentation of pieces of solid silver plate. Dr. O'Reilly replied with considerable feeling to the large gathering, and gave some decidedly interesting reminiscences of his sojourn in the Toronto General Hospital. Dr. Adam H. Wright presided in his usual happy manner. Dr. O'Reilly, accompanied by Mrs.

O'Reilly, his son Dr. Breffney O'Reilly, and Dr. Gerald O'Reilly, of Guelph, sail on July 1 for Ireland, and will spend a year or two traveling in the old land.

Ontario Medical Association.—The twenty-fourth annual meeting of the Ontario Medical Association convened in Toronto on June 6, and continued for the two following days, the meeting proving the second largest and one of the best in the history of the Association. It convened under the Presidency of Dr. William Burt, of Paris, the Secretary being Dr. Charles P. Lusk, of Toronto. Dr. Charles A. Hodgetts, Secretary of the Provincial Board of Health, contributed a paper setting forth the advisability and desirability of the Ontario Government establishing a separate Department of Public Health, which met with the approval of the Association, and at a later date an influential committee will wait upon Premier Whitney, to urge this matter upon his Government. In the annual Presidential address, Dr. Burt urges the establishment of schools for research work, and called upon the financial men of the province to contribute in this direction. Dr. R. W. Bruce Smith, Inspector of Public Charities and Hospitals, read a highly important paper, entitled "Preludes to Insanity," which elicited a prolonged discussion. Dr. Herbert A. Bruce, of Toronto, recited his experience with appendicitis for the last eight years, recording 400 cases. Dr. Bruce advocates consultation with a surgeon in all cases as soon as the diagnosis is determined. Dr. A. J. Ochsner, of Chicago, delivered the address in surgery, taking for his subject, "Surgery of the Stomach from the Standpoint of the Physician." Dr. J. F. W. Ross, of Toronto, dealt with "Operations for the Immediate Repair of the Genital Lesions of Childbirth." Dr. Hadley Williams, of London, contributed a paper on "Stone in the Kidney." Dr. H. B. Anderson, of Toronto, took for the subject of his paper, "Diseases of the Myocardium from a Clinical Standpoint." Professor McPhedran presented a practical and interesting paper on "Evidences Resulting from Functional Disturbances of Digestion." Dr. S. M. Hay, of Toronto, read a paper on "A Critical Review of the Operations for Suspension of the Uterus," which evoked considerable discussion. Dr. Graham Chambers, of Toronto, contributed a paper having for its title "Remarks on the Cutaneous Affections Observed in Hysterical Patients." Others who contributed papers were: Drs. Price Brown, of Toronto; James Newell, of Watford, Ont.; T. K. Holmes, of Chatham, K. C. McIlwraith, of Toronto; F. W. Marlow, of Toronto; Edward Ryan, of Kingston, who showed several interesting pathological specimens. Dr. Henry Hewitt, Guelph, Ont., gave his experience with the surgical treatment of chronic nephritis. Dr. W. B. Pritchard, of New York, delivered the address in medicine, taking for his subject "The American Disease—An Interpretation." This provoked an animated discussion. Dr. Ingersoll Olmsted, of Hamilton, read a carefully prepared paper on "Resection of the Splenic Flexure of the Colon—Malignant Disease—with Exhibition of Patient and Specimen." Dr. D. J. Gibb Wishart, of Toronto, read a paper on the faucial and lingual tonsils. Still other papers were contributed by Dr. R. D. Rudolf, of Toronto; Dr. C. B. Shuttleworth, of Toronto; Dr. H. H. Oldright, of St. Catharines; Dr. G. H. Burnham, of Toronto; Dr. Goldwin Howland, of Toronto; Dr. C. J. C. O. Hastings, of Toronto, and W. B. Thistle, of Toronto, the latter on "The Treatment of Intestinal Lesions in Typhoid Fever," in which

the writer advocated his eliminative treatment, and stated that the last 100 cases under his and Dr. W. P. Craven's care, in the Toronto General Hospital, had resulted in only one death by this form of treatment. Dr. C. D. Parfitt dealt with tuberculosis, Dr. Paul Scott, Toronto, and Dr. T. Shaw Webster following with carefully prepared papers. Dr. Campbell Meyers read a notable paper advocating wards in general hospitals for acute nervous and mental diseases, which resulted in the appointment of a committee to wait upon the Government in the matter. The next place of meeting will be in Toronto, with Dr. George A. Bingham as President, Dr. Charles P. Lusk, Secretary, and Dr. Fred. Fenton, Treasurer, both of Toronto. Altogether the meeting was a pronounced success, and will result in a great deal of good to the profession of the province.

GENERAL

More Fever Cases in Canal Zone.—Additional cases of yellow fever in the canal zone have been reported to the War Department during the week.

New Orange Hospital.—The first ward in the new Italian Roman Catholic Hospital here was opened on June 13. It will be called the ward of St. Anthony. The hospital itself will be called the Hospital of the Immaculate Conception. There are four separate buildings on Center and Hurlbut streets.

Mosquitoes in China.—In the latest (sixty-sixth and sixty-seventh) issues of Medical Reports of the Chinese Imperial Maritime Customs, two observers throw light on the connection between mosquitoes and malaria. Thus, at Chung-king, fever prevails most in the early spring, when there are no mosquitoes to be seen. The town is normally, also, so free from the insect that in many places the net is not required. When the streets are flushed by early rain, there is very little fever. At the Haihow harbor light-station, malaria of a quotidian type is serious. No places were found where mosquito larvæ were breeding or could breed, but *Anopheles* were plentiful in European and native quarters. Larvæ were numerous found in rice fields a quarter of a mile distant, obviously carried thither by the prevailing winds. "The officers in charge (of the station) made mighty war on those mosquitoes found within doors, and, whether due to this crusade or not, the members of the light staff have ceased developing the malarial paroxysms."

Annual Meeting of the American Medical Society for the Study of Inebriety and Alcohol.—The thirty-fourth annual meeting of this society will be held in the hall of the Atkinson School Building, Portland, Ore., July 12 and 13, 1905, beginning at 9 A.M. The President's address, by Prof. W. S. Hall, of the Northwestern University of Chicago, Ill., will be a review of the progress of the study of the action of alcohol during the year. The committee on the Influence of Alcohol in Literature and History, will present a report by its president, Dr. John Madden. The committee on Heredity as a Cause in the Disease of Drug and Spirit Taking, will report, and the committee on Patent Medicines, will also submit a statement of their work. Papers will be read by Drs. MacNicholl, Steward and others. The second session, Thursday, July 13, at 9 A.M., will be a memorial service to the memory of the late Dr. N. S. Davis, and a continuation of a similar meeting before the American Medical Association. Addresses are expected from Drs. Hall, Webster, Crothers, Kellogg, Hollister and remarks by ex-Presidents Musser, Billings, Mathews and President

McMurtly, of the American Medical Association. The public are cordially invited to be present.

Some Japanese Hygiene.—The conspectus of Japanese social life, given in the "Mouvement de la Population de l'Empire du Japon" for 1901, is interesting to the student of public hygiene and law, because of the minute detail of births, marriages, divorce, disease, foundling, etc., recorded in every province. The peculiar customs of adoption, which require so much space in the new codes in treatment of the many cases arising in practice, make the subject complex, while decidedly interesting to those who realize the composition of a Japanese family. Communal in idea, origin, and procedure, the family in Japan is less an organism held together by blood ties than a legal entity. Many of the so-called "divorces" are, in the light of occidental ideas and habits, nothing more than the breaking of engagements, and not rupture of the marriage tie; as, for example, when a boy, babe or youth, adopted to marry the house-head's daughter and take his name, fails to become a husband, the law of Japan registers this failure as a divorce. In the very minute tables of decease by disease, the place, sex, cause, and age are given, with recapitulations. Only 260 persons were declared and registered as foundlings in 1901; 91 being babes under twelve months. Of persons naturalized in 1901 there were 27. Of lepers, 2,021 died in 1901; of syphilitics, 9,198; of plague patients, 3; of cholera patients, 484. The most disabling disease, affecting the nerves and circulation (from 70 to 84 per cent. of Oyama's army, according to Miss McGee) is *kakshi*, or beriberi; but the tables show it to be one of the least fatal.

The Housefly in Current Literature.—A recent issue of *Collier's* contains the following pronouncement anent the housefly. The dissemination of this type of information to the public at large is highly desirable: "Now that the housefly is making his appearance, and is likely to remain some months, it becomes our duty to observe some things to his discredit. He is a dirty beast, and danger lurks in him. Once before we wrote of him, at that time frivolously. But who can deny that he sits upon a barrel of swill, until the fancy takes him to try a sugar-bowl or baby's nose? The germ theory sometimes seems elaborate, in these days, when some are found to prophesy even against the tooth-brush, and against the postman's bag. Still, it remains impossible to become scientific without going crazy. In attacking the fly we are safely moderate. He causes more disease in a week than aniline dyes in a month. He is more dangerous than formaldehyde in milk. The above are medical opinions which we eagerly accept. Charity covers a multitude of sins. It does not cover flies. These ranging and obscene animals should die. The only difficulty lies in killing them. Screens on kitchen doors and careful cooks may do more for health than medicine or a quiet conscience. We are not lost to all sentiments of mercy. Like the poet, we can pour regretful tenderness over the translucent small wings crushed accidentally in a book, 'pure relics of the blameless life.' From the fly's point of view he makes the most of things. Who would kill even a mosquito for doing his best? But man is devoted to himself, and these disease-bearing denizens of the air are fatal to him and his young offspring."

Sioux Valley Medical Association.—The ninth annual session of this association was held in Fort Dodge, Iowa, June 14 and 15. The following interesting program was given: "President's Address," by Dr. M. Sullivan, of Adrian, Minn.; "Cases in Practice with Unusual Pathology," by Dr. Edw. Hornibrook, of

Cherokee; "The Clinical Variations of the Vermiform Appendix with Special Reference to its Development," by Dr. J. A. Dales, of Sioux City; "Talipes Equino Varus," by Dr. P. E. Sawyer, of Sioux City; "Wear and Care of the Nervous System," by Dr. Leo M. Crafts, of Minneapolis; "The Influence of Massage, More Especially as it Effects the Nervous System," by Dr. M. L. Voldeng, of Cherokee; "Catarrhal Deafness; Its Prevention," by Dr. F. Roost, of Sioux City; "Eye Symptoms in Medical Diagnosis," by Dr. F. E. Franchere, of Sioux City; "The Pharyngeal Tonsil as a Causative Factor in Systemic Disturbances," by Dr. W. J. Bussey, of Sioux City; "Influenza," by Dr. C. H. Hall, of Cherokee, Iowa; "Auto Serotherapy," by Dr. G. S. Browning, of Sioux City; "Treatment of Acidosis and Sugar States from Traumatism," by Dr. Geo. F. Butler, of Chicago; "Gastropnoia," by Dr. L. W. Littig, of Iowa City, Ia.; "The Physician's Duty to the Patient in Tuberculosis," by Dr. R. E. Conniff, of Sioux City; "Infection of the Ovaries and Tubes and Natural Resistance to Invasion," by Dr. J. R. Brady, of Sioux City; "The Treatment of Diffuse Septic Peritonitis," by Dr. V. B. Knott, of Sioux City; "Anatomic Factors to be Considered in Prostatectomy," by Dr. Wm. Jepson, of Sioux City; "Intestinal Perforation in Typhoid Fever; Report of Cases," by Dr. W. Courtney, of Brainerd, Minn.; "Intestinal Obstruction," by Dr. J. R. Guthrie, of Dubuque; "Surgical Intervention in Stomach Troubles," by Dr. E. E. Dorr, of Des Moines; "Similar Diagnostic Points Occurring in Acute Appendicitis and Diseases of the Biliary Tract," by Dr. A. M. Pond, of Webster City, Iowa; "The Management of Appendicitis by the General Practitioner," by Dr. W. E. Sanders, of Alta, Iowa; "Delusions," by Dr. A. Anderson, of Estherville, Iowa; "Gun Shot Injuries of the Stomach," by Dr. J. N. Warren, of Sioux City.

Missouri Valley Excursion to Portland.—A delightful outing in the wonderland of America, is the pleasant anticipation of those who have joined the Missouri Valley excursion party to Yellowstone Park, and the meeting of the American Medical Association in Portland. A special train, via the Burlington route and Northern Pacific, will leave Kansas City on Thursday evening, June 29, at 6.10 P.M., St. Joseph 8.25 P.M., Omaha 11.10 P.M., and Lincoln 1.20 A.M. Friday, arriving in Yellowstone Park on Saturday morning, July 1, where it will be met by the park coaches, making a week's tour of the park. One day will be spent in Seattle and a part of a day in Tacoma, where the party will be entertained by the local societies, arriving in Portland on Sunday evening, July 9, in advance of the large parties from the East. All who have attended these meetings will appreciate the advantage of arriving early and being settled in their hotels before the rush. **Party No. 2.**—Another train will leave Kansas City, Lincoln and intermediate points via the Burlington on the evening of July 6, for those who wish to go direct to Portland. Stopovers in Seattle, Tacoma and other points will be allowed. Everyone is welcome, doctors, their wives and families and their friends, whether they are members of our society or not. **Expenses.**—Round trip rates from Missouri River points to Portland, \$45. The expense for the week in Yellowstone Park, \$45.90, including board and transportation; or \$38.30 via the Permanent Camp Co., which is said by many to be the superior route, and the most enjoyable. The secretary is investigating its merits. Double berths in standard sleeper through to Portland, \$11.50; tourist sleeper, \$5.75.

Return Trip.—One must decide on the return trip before starting; there are a number of routes which

may be selected without extra cost. For example, one may return through Salt Lake, Colorado Springs, Manitou and Denver, with stopovers as desired, within the limit of ninety days. For \$4 extra one may return over the Northern Pacific, Great Northern or Canadian Pacific through St. Paul. For \$11 additional, one may return through San Francisco and Los Angeles via the Southern Pacific, or over the Santa Fe, through the Grand cañon of Arizona. The trip is one of the most wonderful in the great Southwest, and a magnificent new hotel has just been completed for the care of visitors. Side trip from Williams is but \$6.50 for round trip. Full information on application to any Santa Fe agent. Pullman reservations should be made at once through the secretary, as the number in the party will be necessarily limited. Chas. Wood Fassett, Secretary, St. Joseph, Mo.

Fifteenth International Medical Congress.—Anticipating that a large number of American physicians will attend the Fifteenth International Medical Congress, to be held in Lisbon, Portugal, April 19 to 26, 1906, the undersigned has completed arrangements for the chartering of a first-class vessel, upon which the American delegation may sail as one party. In this way better accommodations can be secured at a more reasonable price; the social features in the trip will be enhanced and each individual surrounded by those who are personally congenial. Additional security and consequently added pleasure will be obtained as the party will be in charge of a traveling conductor, who is thoroughly conversant with the language and customs of the countries to be visited en route. As there will doubtless be some diversion to the choice of the routes, depending on individual inclination and previous opportunities for foreign travel, a number of returning routes have been selected, and the itineraries of which, although separate from the journey proper, have been arranged so that the principal points may be visited together. Those who desire may include a Mediterranean trip. Excursions to Madrid, Corunna, Vigo, Oporto, the Escorial, Toledo, Seville and Cordova have been arranged, as well as an opportunity to return leisurely through Italy, France and Great Britain. Hotel reservations for the party have also been arranged for in the best hosteleries of Lisbon, and in addition a number of floating hotels will be anchored in the Tagus during the entire session of the Congress, thus enabling visitors who desire to enjoy all the comforts of a superb hotel on the water. The round-trip rates from New York, will run from \$275 up, according to the tour selected, including all expenses. Itineraries of the various tours are being prepared and will soon be ready for distribution. It is important that all who contemplate taking this trip should register at once so that no disappointment in hotel reservation may be experienced. The final arrangements will, as heretofore, be in the hands of the well-known conductors, Thos. Cook & Sons, which insures perfect and complete service, thus relieving the passenger from all annoying details incident to the voyage. Those delegates who attended the last Congress in Madrid, sailing from New York on the "Princess Irene," will remember the excellent service afforded them. Dr. John H. Musser, Philadelphia, is chairman of the National American Committee, and Dr. Ramon Guiteras, 75 West Fifty-fifth Street, New York City, is the secretary, to whom all applications for membership and communications in regard to the presentation of papers should be addressed. Further information, reservations and copies of itinerary may be obtained by addressing the last named undersigned. Lewis S. McMurtry, M.D., Louisville; Nicholas Senn,

M.D., Chicago; J. D. Griffith, M.D., Kansas City, Mo.; W. F. Southard, M.D., San Francisco; Frank P. Norbury, M.D., Jacksonville, Ill.; Jas. E. Moore, M.D., Minneapolis, Minn.; R. T. Morris, M.D., New York; A. Vander Veer, M.D., Albany, N. Y.; Jos. M. Matthews, M.D., Louisville, Ky.; J. B. Murphy, M.D., Chicago; Wm. T. Corlett, M.D., Cleveland, Ohio; C. H. Hughes, M.D., St. Louis; Chas. Wood Fassett, M.D., Krug Park Place, St. Joseph, Mo.

OBITUARY.

Dr. JACOB PRICE, one of the oldest physicians of Chester County, Pa., died at West Chester, June 9, 1905. He was taken ill while at his work in the Chester County Hospital a few days before his death. Dr. Price graduated from the Jefferson Medical College in 1850.

Dr. LAWRENCE C. SWIFT, medical examiner for Central Berkshire County, Mass., and a prominent surgeon, died last week in Pittsfield, of cerebrospinal meningitis. He was born in Geneva, N. Y., and was a son of McFee Swift, a civil engineer, who helped lay out the Erie Railroad. His grandfather, Col. Joseph Gardner Swift, was the first graduate of West Point, and afterward superintendent of West Point from 1812 to 1817. Dr. Swift graduated from the College of Physicians and Surgeons of New York in 1878, and practised in Des Moines until 1886, when he returned East.

Dr. DAVID DENNISON STEWART died at his home in Philadelphia, on June 13. His death closely followed the second operation for appendicitis within a few months. He was forty-six years old, unmarried, and was a son of the late Franklin Stewart, of this city. He was a graduate of Jefferson Medical College, a member of the College of Physicians and Surgeons, and physician-in-chief at the Episcopal Hospital. He had made a specialty of diseases of the heart, stomach, kidneys and nerves, and in recognition of his success as neurologist he was elected a corresponding member of the Edinburgh Society of Physicians at the same time Dr. William Osler and Dr. S. Weir Mitchell were so honored.

SPECIAL ARTICLE.

ON THE OCCURRENCE OF SPIROCHAETA PALLIDA, SCHAUDINN, IN SYPHILIS.¹

BY SIMON FLEXNER, M.D. AND HIDEYO NOGUCHI, M.D.,
OF NEW YORK.

In the last few weeks several papers have appeared in the German and French medical literature,² dealing with the spirochaete which Schaudinn and Hoffmann described as occurring in recent syphilitic lesions. The first paper by Schaudinn and Hoffman appeared almost

¹ From the Rockefeller Institute for Medical Research, New York.

² The complete bibliography of the subject, up to the present time, is as follows:

Schaudinn and Hoffmann. Vorläufiger Bericht über das Vorkommen von Spirochaeten in syphilitischen Krankheitsprodukten und bei Papillomen. Arbeiten aus dem Kaiserlichen Gesundheitsamte, Berlin, April 10, 1905, XXII, zweites Heft, 527. Schaudinn and Hoffmann. Ueber Spirochaetenbefunde im Lymphdrüsenast Syphilitischer. Deutsche medizinische Wochenschrift, May 4, 1905, XXXI, 711.

Metchnikoff and Roux. Recherches microbiologiques sur la syphilis. Bulletin de l'Académie de Médecine, Paris, May 16, 1905.

Buschke and Fischer. Ueber das Vorkommen von Spirochaeten in inneren Organen eines syphilitischen Kindes. Deutsche medizinische Wochenschrift, May 18, 1905, XXXI, 791.

Levaditi. Syphilis congenitale et Spirochaeta pallida Schaudinn. Comptes rendus de la Société de Biologie, May 26, 1905, LVIII, 845. La Presse Médicale, May 31, 1905, No. 43, 337.

Schaudinn and Hoffmann. Ueber Spirochaeta pallida bei Syphilis und die Unterschiede dieser Form gegenüber anderen Arten dieser Gattung. Berliner klinische Wochenschrift, May 29, 1905, XLII, 653.

simultaneously in the Arbeiten aus dem Kaiserlichen Gesundheitsamte and the Deutsche medizinische Wochenschrift. The paper in the former publication was illustrated with two microphotographs, showing the form of the organism. These papers were quickly followed by two communications from Metchnikoff's laboratory in the Pasteur Institute, confirming and accepting the discovery, and drawing attention to the interesting fact that Bordet and Gengou had observed the same micro-organism in a syphilitic chancre some three years before. However, as they failed to discover it in some syphilitic lesions which they subsequently studied, they abandoned any future search for it.

Hoffmann and Schaudinn's first publication dealt with a study of primary chancres, the enlarged glands of the groin attending these lesions and flat condylomata in syphilitic patients. The study consisted in the examination of fresh specimens obtained from the surface and interior of the primary lesions and the interior of lymph glands and condylomata, and stained specimens from the same sources. Certain control examinations were also made of non-syphilitic lesions of the genitals and of mixed lesions of these parts. The results were quite uniform and suggestive. From the cases of simple syphilitic infection the lymph glands, condylomata and interior of chancres, showed a variable number of spiral micro-organisms of great tenuity for which they propose tentatively the name *Spirochaeta pallida*, while the non-specific lesions showed a second spiral micro-organism, for which they also propose the name of *Spirochaeta refringens*. The latter organism had, doubtless, been seen and described before by several observers, notably by Berdal and Bataille,³ Csillag⁴ and Roma.⁵ Schaudinn and Hoffmann did not find the first spirochaete in non-syphilitic lesions, nor did they find the second in the interior of the syphilitic lesions studied by them. From the study of Schaudinn and Hoffmann it is not difficult to explain the failure of previous investigators to perceive *Spirochaeta pallida* and in especial Bordet and Gengou's failure to obtain it in all of the several cases studied by them. The organism is difficult to see in the fresh state, and it is also highly refractory to staining so that special methods are required to demonstrate it in fixed preparations. The description of the organism is as follows:⁶ In the length the spirochaeta varies from 4 to 10 μ , the average being 7 μ ; in width the variation is from unmeasurable thinness to $\frac{1}{2}$ μ . The number of bends is from 3 to 12. The organism agrees in motility with the spirochaete rather than the spirilla; there are three characteristic movements: rotation on the long axis, forward and backward motion and bending of the entire body. There are indications of an undulating membrane but none of flagella. The poles end in sharp points. No further details of structure have been made out thus far.

For the purpose of the study of the fresh material dilution with salt solution of the expressed juices of primary lesions, or the fluid drawn by aspiration from the lymph glands, is permissible. Prepared in this way the spirochaeta were still actively motile, according to Schaudinn and Hoffmann, after six hours.

The staining is accomplished with difficulty and the best results thus far have been obtained with Giemsa's eosin solution and azure. Schaudinn and Hoffmann recommend the following formula:

Twelve parts of Giemsa's eosin solution (2.5 c.c. 1 per cent. eosin, 500 c.c. water).

¹ Quoted by Schaudinn and Hoffmann.

² Quoted by Schaudinn and Hoffmann.

³ Quoted by Schaudinn and Hoffmann.

⁴ Schaudinn and Hoffmann. Arbeiten aus dem kaiserlichen Gesundheitsamte, 1905, XXII, zweites Heft, 327.

Three parts Azur No. I (1:1,000 solution in water).

Three parts Azur No. II (0.8:1,000 solution in water).

The mixture is to be freshly prepared. The films, which should be thinly spread, are dried in the air and then hardened in absolute alcohol for ten minutes, after which they are immersed in the stain from sixteen to twenty-four hours. They are to be washed in water, dried in the air and examined in cedar oil.

Our study has thus far comprised a small number of recent cases of syphilis and two cases of non-syphilitic ulcer of the penis. We are indebted for the material studied to Dr. V. C. Pedersen, to whom we wish to express our obligations. The cases are as follows:

Case I.—Male, twenty years old. Luetic infection December, 1904. No regular treatment. He presented mucous patches of the tonsils and soft palate, and a fading rash of the trunk. Between the buttocks, flat condylomata. A condyloma was excised. Smears were made and stained in various anilines and with eosin-azur. Fresh preparations in salt solution were also studied. In the latter no characteristic organisms were found. The stained preparations were positive, showing a variable number of thin, lightly-stained spiral organisms identified as the species described by Schaudinn and Hoffmann. The positive results were obtained with aniline-water-gentian violet and eosin-azur, the latter having given the most satisfactory results. The films varied greatly, even with the same method of preparation. In some the number of stained spirals was very small, while in others the number was large, a single field showing as many as five. In still other cover-glasses no organisms could be discovered. The spirals were long for the most part and showed from six to twelve bends or curves.

Case II.—Male, aged thirty-four years. Burrowing non-syphilitic ulcer of the penis. Smears from the surface only could be obtained and they were negative for spiral micro-organisms.

Case III.—Male, aged twenty-three years. Mucous patches in mouth. Healed scar on penis. Enlargement and induration of glands of the groin. A small quantity of fluid, consisting of blood and lymph cells aspirated from the enlarged glands. Fresh preparations negative; smears stained in eosin-azur showed a very few delicate, faintly-staining spiral organisms.

Case IV.—Male, aged eighteen years. Infection in January. For several weeks active antisyphilitic treatment. Primary lesion on glans penis; marked swelling of the glands of the groin. Part of primary lesion was excised and fluid was aspirated from an enlarged gland. In the fresh fluid of the gland diluted in sterile salt solution several small and a single larger motile spiral organism were seen. None of the stained preparations from the primary lesion or the gland juice showed spirochaetae.

Case V.—Colored male, aged twenty years. No definite history of time of infection. Presented himself with phimosis and balanitis. After incision of the prepuce three separate elevated, indurated lesions regarded as chancres appear. Moderate swelling of the glands of the groin. One of the lesions excised. Smears and fresh preparations were made from the base of the lesion. Fresh preparations negative. The smears stained in eosin-azur showed a moderate number of delicate spirals, agreeing with the description given by Schaudinn and Hoffmann. They varied in number in different cover glasses, and in some could not be found. The curves numbered from eight to twelve.

Case VI.—Male, aged twenty-three years. Non-syphilitic ulcer of penis; duration twelve days. Films stained in eosin-azur were negative for spirochaetae.

From this small series of cases it will be seen that of the four cases of syphilitic lesions the spiral organisms were obtained in stained preparations three times, while in the two cases of non-syphilitic lesions studied they could not be found. An anomaly exists in respect to Case IV, in which the spirals were missed in stained preparations, while they appeared to be present in the fresh state. No explanation can now be offered for this occurrence.

Schaudinn and Hoffmann express themselves very guardedly regarding the significance of the spirochaeta. They point out its presence in the typical lesions of the disease and its absence in the other forms of venereal disease studied. Important confirmatory contributions have come from Metchnikoff and Roux, who have demonstrated the same organism in the lesions of acquired syphilis in man and in experimental syphilis in the monkey and ape. In the last animals the material for study was obtained from the primary lesions produced by inoculation before ulceration had taken place. Additional confirmatory evidence of importance as regards the distribution of the spirochaeta is supplied by the observation of Levaditi and Buschke and Fischer upon congenital syphilis. These writers found that organism in the pemphigus bullæ and papules of the skin, and, in cases coming to autopsy, in films from the spleen and liver. Schaudinn reports that he also has obtained it from splenic juice removed by aspiration from a syphilitic patient.

Metchnikoff and Roux draw attention to the irregularity of distribution of the organism as indicated by the variation in numbers upon the cover slips. We have observed the same irregularity, but we are not yet prepared to state that the difference may not be due to the imperfect technic in staining. Metchnikoff and Roux and Levaditi prefer a more rapid method of staining the films, namely that of Marino,¹ which, up to the present, we have used but little. Should it serve as good a purpose as the slower eosin-azur, and should future study confirm the etiological position of the spirochaeta, a rapid and useful, and perhaps even a specific method of diagnosis would be afforded. Since the organism exists in the primary lesions and the glands of the groin in a demonstrable form, and since fluid from each can be obtained easily, with the infliction of little pain to the patient, and without in any way prejudicing the progress of his disease, we may look for a general study of the fluids obtained from these sources in suspicious and established forms of venereal disease with reference both to the occurrence and the specificity of *Spirochaeta pallida*.

SOCIETY PROCEEDINGS.

NATIONAL ASSOCIATION FOR THE STUDY AND PREVENTION OF TUBERCULOSIS.

First Annual Meeting, held in Washington, D. C., May 18 and 19, 1905.

SECOND DAY, MAY 19TH—(Continued).

(Continued from Page 1097.)

PATHOLOGICAL AND BACTERIOLOGICAL SECTION— (Continued).

Differences as to Primary Intestinal Tuberculosis.—Heller, of Kiel, finds a very large proportion of children who suffer from primary intestinal tuberculosis. At Berlin only two per cent. of children, sufferers from tuberculosis, have suffered primarily through the intestines. In Boston the proportion

¹ Annales de l'Institut Pasteur, 1903, XVII, 357.

is much higher than this, though not nearly so high as in Kiel, while New York statistics seem to agree more nearly with those of Berlin. It is very difficult to explain these differences on any ordinary ground. It is true that in Schleswig-Holstein it is the custom to feed the children on unsterilized milk, while this is practically never done in Berlin, thus allowing many more opportunities for infection in the material that is examined at Kiel. This, however, is not enough to account for the difference noted. Heller insists that the technic of post mortem examination on the intestines in Berlin is unparadoxably bad. The whole matter must be left undecided.

Human and Bovine Tubercle Bacilli.—It is now possible to tell whether a definite colony of tubercle bacilli is of bovine or human origin. The method is laborious and time taking, but is conclusive. In five cases now. Theobald Smith has found that primary intestinal tuberculosis was due to bovine tubercle bacilli. The Imperial Department of Health, in Berlin, evidently at the suggestion of Koch, undertook an investigation in the same line, and were satisfied that in three of the ten cases of primary intestinal tuberculosis, there was no question that bovine tubercle bacilli had been actively virulent in children. This number has since been added to by the same bureau of investigation. Behring, on the other hand, insists that nearly all cases are of bovine origin. He adds further that many children acquire tuberculosis during their almost exclusive milk diet life, and that this is what constitutes the real predisposition to tuberculosis in after life. This opinion will undoubtedly stimulate as much research as did Koch's declaration of the absolute difference and non-intercommunicability of bovine and human tubercle bacilli. There is no doubt that tuberculosis is much more frequent in infancy, and even the first few months of life, than has been supposed.

Early Tuberculosis and Immunity.—The interesting question has occupied many generations as to what relation there is between infantile tuberculosis and phthisis in later life. Professor Flint used to say that recovery from scrofula seemed to confer a certain active immunity to progressive tuberculosis in later life. Behring has insisted that protective immunity is produced in this way, yet there is no doubt that some of the supposed changes in structures which he has pointed out as consequent upon early infection with tuberculosis are fanciful and not justified by anatomical investigation. As a curious commentary on this possible immunity from early infection, a set of statistics, collected in German sanatoria for tuberculosis, showed that few of the patients had been artificially fed on milk when infants.

Congenital and Hereditary Tuberculosis.—While generally conceded that the predisposition to tuberculosis was not infrequently inherited, it used to be considered that congenital tuberculosis was rather a curiosity. Baumgarten expressed the opinion that very many people were born with tuberculosis, but this was generally scoffed at. There are many demonstrated cases in which the presence of tuberculosis congenitally has been noted. One proof has been the great frequency of tuberculosis in the placenta of tuberculous women. In twenty cases Schmorl found that in nearly one-half there were demonstrable lesions of tuberculosis in the placenta. These occurred not only in the case of mothers suffering from advanced or milary tuberculosis, but also in incipient cases. No doubt in most of these the

tubercle bacilli would find their way into the fetus. Hence, congenital tuberculosis must be considered more important than it has been. The rise of fatality in tuberculosis during the second quarter of the first year of infant life would seem to point to its development during the latter part of intra-uterine life.

Respiratory Tuberculosis.—It has been calculated that at most only four per cent. of the bacteria in the air breathed could possibly succeed in finding their way through the nose and the pharynx past the moist defences provided by nature to the lower respiratory tract. Even this, however, would be quite sufficient to account for many infections to the lungs. Certain it is that many other particles, such as soot, coal dust, and stonedust, find their way into the lungs in large quantities. The principal evidence, however, of the occurrence of aerogenic infection is the localization of the tuberculous process so often in the bronchial glands. It is evident that these bacilli have come from the parts of the body in the immediate connection with these glands, and not by any reversed current from other tissues. If then there is no tuberculosis elsewhere, its presence in the bronchial glands is of itself sufficient to show that the tuberculosis has been acquired primarily through the respiratory tract.

Frequency of Bovine Tuberculosis in Human Beings.—Dr. Leonard Pearson, of Philadelphia, said that many recent statistics seem to show a higher frequency of human infection with bovine tubercle bacilli than that suggested by Dr. Welch. The English Commission appointed to investigate the subject, for instance, has found that in one-third of all the cases of primary intestinal tuberculosis the bacilli at work were of bovine origin. German observers found that over 14 per cent. of all primary intestinal tuberculosis was due to bovine bacilli. To Dr. Pearson it seems that probably one-half of all the intestinal tuberculosis is of bovine origin.

Marmorek's Antituberculous Serum.—Dr. Arthur J. Richer, of Montreal, discussed the therapeutic value of Marmorek's Antituberculous Serum. At first public sentiment was almost hostile to the use of the remedy and Dr. Richer began as a skeptic. He found it of such good service in advanced cases, however, that he prevailed on a few patients with incipient tuberculosis to try it. In seven advanced cases there was always improvement after its employment and four have kept up this improvement. Up to the present he has used it in nine incipient cases, and in most it has brought improvement in the first forty-eight hours after the injection. The serum produces no reaction in healthy subjects. Dr. Richer has injected 10 c.c. into himself without producing any reaction.

Symptomatic Relief.—It produces an effect upon symptoms at once. The pulse comes down and the temperature is reduced, and the lack of appetite so characteristic of certain early progressive cases is at once relieved. The remedy may be considered to be truly specific, since it did not fail in a single instance to bring relief. Dr. Richer's custom is to give an injection of 10 c.c., followed by a similar dose three days later. Then there is a rest of over a week. When decided improvement has taken place, the injections are repeated not oftener than once a month.

Serum Diagnosis of Tuberculosis.—Dr. Hugh M. Kinghorn, of Saranac Lake, N. Y., read a paper in which he discussed the agglutination test for tuber-

culoc'. Ordinarily tubercle bacilli grow in compact masses, and may be said to be agglutinated from the beginning. If grown for a time on potatoes, however, and then transferred to beef broth, the culture becomes homogeneous, and may be used for agglutination test. According to the experience at Saranac, the serum of agglutination cannot be depended upon as a diagnostic test, though some observers have considered it of equal value with Koch's tuberculin in this respect. As regards prognosis, it seems to have more value. A positive reaction is present in cases that are running a favorable course. In far advanced cases, with extensive lesions and progressive course, the serum reaction is absent. The agglutinative reaction has been found in a certain number of healthy persons, but they were individuals much in contact with tuberculous patients, and who might be thought, therefore, to be harboring tubercle bacilli some place in their tissues.

Agglutination and Prognosis in Tuberculosis.—Dr. H. R. M. Landis, of Philadelphia, read for himself and Dr. Ravenel a paper on the value of the agglutination test for estimating the prognosis in tuberculosis. The higher agglutination reactions occur in incipient favorable cases. A patient who gained 45 pounds, but had the rapid pulse of an unfavorable case gave the agglutination test only at a dilution of one to ten. Agglutination is not of service for diagnosis, but is for prognosis. A stay in a well-conducted sanatorium always raises the agglutination power.

Immunity in Tuberculosis.—The papers on immunity in tuberculosis, the first on the properties of the serum of immunized rabbits, and the second a histological study of the lesions in immunized rabbits, were presented from Dr. Trudeau's laboratory at Saranac Lake.

Properties of the Serum of Immunized Rabbits.—Dr. E. R. Baldwin discussed the observations made by himself, and Drs. H. M. Kinghorn and A. H. Allen, of Saranac Lake. These observations were made on Belgian hares. Thirteen were vaccinated by weekly virulent bacilli which had lost their virulence by long keeping. Usually no effect was produced by the vaccination as regards the immediate health of the animal. These animals were then inoculated with virulent cultures of tubercle bacilli. During the first ten days after the inoculation, the fever was higher and the general symptomatic reaction worse in the vaccinated animals than in the unvaccinated. After this, however, there was a reversal and the non-vaccinated animals showed more symptoms. This state of affairs continued as long as the animals continued to live. The vaccinated animals grew constantly better, the unvaccinated animals constantly worse. At the autopsies on the animals it was found that this state of affairs corresponded with the inflammatory reaction produced, which was greater at first in the vaccinated, but much less later on.

Morbid Lesions in Immunized Rabbits.—Dr. J. D. Nichols, of Saranac Lake, said that during the first days after inoculation, the vaccinated animals presented a much higher temperature than those that had been unvaccinated. Even after twenty-four hours, if the animals were put to death, the appearances were quite different. In the vaccinated animals there was congestion and many leucocytes evidently prepared for the reaction against the virulent bacilli, which was about to take place. After a time in the vaccinated animals the tubercles were seen to be breaking up. The infiltration around them

was disappearing and the congestion lessening. The capillary rings around the tubercles are still distinct and the cells of the vessels contain much nuclei. After a time the bacilli had totally disappeared from the lesions in the vaccinated animals, while many micro-organisms were still to be found in the control animals.

Artificial Immunity.—Dr. Trudeau, in opening the discussion, said that when fifteen years ago he first presented the subject of artificial immunity to the profession, it seemed to be the dream of an idealist. Now there are many more objective grounds for crediting its possibility. So far, however, no positive lasting immunity in tuberculosis has been obtained. One difficulty, of course, is to be found in the fact that the animals used do not always react as expected. The rabbit, for instance, is not always affected by human tuberculosis. Vaccination then will sometimes fail and the inoculation may prove illusory because the special animal used may have had a higher protective reaction than was expected.

Vaccination by Dead and Living Bacilli.—Dr. Trudeau said that a certain amount of immunity can be produced by dead as well as by living bacilli. Vaccination by dead bacilli, however, does not stand the test of time, and indeed, as a rule, soon ceases to provide any active protection. The degree of success obtained depends somewhat on the cultures used for vaccination purposes. At Saranac the custom has been to employ cultures of tubercle bacilli whose virulence has been attenuated by growth on media outside the body for many years. For instance, they still possess at Saranac the descendants of the original culture of the *Bacillus tuberculosis* obtained by Koch twenty years ago. Another bacillus that is used for vaccination purposes is that of a human tubercle bacillus that has been grown on artificial media for fourteen years. Besides these two cultures supposed tubercle bacilli from cold-blooded animals were used in order to note the difference in the immunity of pain.

Effects of Vaccination.—With regard to the so-called tubercle bacilli from cold-blooded animals, no vaccinal effect at all could be noticed. Much work has been done in this line and reported in such a way as to raise hopes with regard to it, but no confirmation of these conclusions could be obtained at Saranac. Animals vaccinated with such cultures were not at all protected against virulent tubercle bacilli. On the other hand, animals vaccinated with the original culture of Koch's bacillus were somewhat protected, though the protection afforded was not very striking. On the other hand, animals inoculated with the fourteen-year-old cultures of human bacilli were so well protected that only rarely could lesions be seen after inoculation with virulent tubercle bacilli. In one only one caseous spot could be found after careful search.

Phagocytosis in Tuberculosis.—Dr. William H. Welch, of Baltimore, in discussing the question of immunity in tuberculosis, said that it would be interesting to determine whether there is really a phagocytic action which is increased by such vaccination. It is possible that the predisposition to tuberculosis consists only in a lowering of the bower of the phagocytes in a particular individual. Vaccination then, as studied at Saranac, would seem to show a greater susceptibility in the animal, but at the same time a greater resistance. The studies seem to point to the teaching so common in the old time that the tubercle is not the essence of the dis-

ease in tuberculosis, but that it is rather the effort of nature to protect herself against invasion.

Studies in Immunity.—Dr. Leonard Pearson said that the first studies in tuberculous immunity were made here in America, the work of Drs. Trudeau and De Schweinitz, antedating those of the German investigators in this field. American work has always had more lasting value in this matter than that of foreign countries. With regard to the so-called tubercle bacilli of cold-blooded animals, and especially the frog bacilli, recent investigations seem to show that these are not true tubercle bacilli, but are only certain acid fast bacilli resembling tubercle bacilli, that is, certain micro-organisms which are not decolorized by acids once they are stained, though they have no relationship with the true bacillus of tuberculosis. These frog bacilli are common in ponds and are really saprophytes and do not belong in the group of pathogenic bacilli at all.

Observations on Monkeys.—Dr. Pearson has been experimenting with the immunization of monkeys, but has not succeeded to any extent. These animals were vaccinated by means of avian tubercle bacilli and were then exposed at the Zoological Garden among other monkeys suffering from tuberculosis. They did not seem to be protected against the disease. Any vaccination for tuberculosis so far obtained, even for animals, is not absolute, but it must be remembered that the vaccination for anthrax is not absolute, and yet it is very protective for a time. Cattle vaccinated against anthrax will acquire the disease if given a massive dose of infected material, but they are protected against all ordinary doses.

Human Inoculations with Virulent Cultures.—Dr. Welch, of Baltimore, said that certain of the foreign observers have, after supposedly vaccinating themselves against tuberculosis, dared to inject tubercle bacilli into themselves. Klemperer is one of those who has been taking such observations. Möller even went so far after vaccinating himself with cultures of a supposed tubercle bacillus found in the sloe worm, as to inject virulent cultures of human tubercle bacilli intravenously. It is true that a very small amount of the culture was used, and the medical world has not taken the observation very seriously.

The Blood in Tuberculosis.—Dr. F. A. Craig, of Philadelphia, read for himself and Dr. Josephus Ullum, a discussion of observations on the blood with special reference to the prognosis of tuberculosis. In unfavorable cases they have found a much greater decrease of the red blood corpuscles than in those in which the prognosis was better. A low hemoglobin content was also of unfavorable prognostic significance. In unfavorable cases the lymphocytes particularly were reduced in number. As soon as the patient begins to improve, there is an increase in the red blood corpuscles, but a still more marked increase in the leucocytes. Whenever there is not a leucocytosis under treatment, the case is not favorable. An increase of the lymphocytes particularly is a sign of increase of resisting power.

Dr. William S. Welsh said that as it is the mononuclears which ingest bacteria and act as phagocytes, this observation of the increase of the large and small lymphocytes is especially interesting. There seems to be no doubt now that in certain fevers the polynuclear leucocytes are inhibited. The question as to their inhibition in tuberculosis would then be interesting.

In closing the discussion Dr. Craig said that the only case in which a number of polynuclear leucocytes were seen was one of empyema. It would seem then that there was inhibition of the polynuclear leucocytes in tuberculosis.

Chlorosis in Tuberculosis.—Dr. W. B. Stanton, of Philadelphia, said that the diagnosis of latent or incipient tuberculosis is extremely important and every possible hint for early recognition must be taken. It would seem that in certain patients whose blood is especially sensitive, a blood examination might be of help in these cases. He called attention to the fact that in recent years, when the early diagnosis of tuberculosis is much better understood than it used to be, there are ever fewer cases of chlorosis in the literature. It would seem as though not a few of the cases of supposed specific anemia in young girls were cases of incipient tuberculosis.

Thyroid Gland in Tuberculosis.—Dr. W. B. Stanton, of Philadelphia, said that the older pathologists considered that the thyroid gland was practically immune to tuberculosis. Rokitsansky, who had made so many autopsies, considered that it was never affected by the disease. Virchow thought that it was the organ least affected in the body. As a rule thyroid tuberculosis is dismissed in the text-books with a few lines. Dr. Stanton has found it, however, in autopsies at the Phipps Institute, much more common than has been thought. It occurs in two forms, a nodular, and then in miliary tuberculosis. The latter is the most frequent.

Graves' Disease and Tuberculosis.—Dr. Stanton has found that under certain circumstances, the symptoms of so-called latent Graves' disease, or the abortive forms of the affection, are like those of tuberculosis. This is especially true as regards the tremor, the rapid pulse and the slight thyroid enlargement. These symptoms disappear in many cases under the same form of treatment as improves tuberculosis. There seems to be no doubt that some of these patients are really suffering from incipient tuberculosis, not necessarily affecting the thyroid, but giving symptoms resembling an affection of that gland. It seems possible that the thyroid itself is roused into activity by the presence of tuberculous lesions much oftener than has been thought.

Tuberculous Toxins.—Dr. D. J. McCarthy, of Philadelphia, said that the symptoms pointed out by Dr. Stanton were a product of the toxins of tuberculosis and not of any increased secretion of the thyroid. In incipient cases of tuberculosis, tachycardia and some tremor are very common. These symptoms are due to the action of the toxins of tuberculosis on the sympathetic system. There may be an affection of the thyroid complicating tuberculosis, but the thyroid itself is not often affected in the early stages of the disease.

Dr. Trudeau said that it is at times very difficult to decide just what the suspicious symptoms attributed to early tuberculosis may be due to. This is especially true for the tachycardia and tremor, with other nervous disturbances. In such cases, tuberculin is of value as an aid to diagnosis.

Dr. Baldwin said that the toxin of tuberculosis undoubtedly acts on the nervous system and especially on the sympathetic nervous system.

Dr. Newman said that he had recently seen a case in which the symptoms of Graves' disease developed during phthisis. The Graves' symptoms reached their maximum in two weeks and had no influence at all on the cause of tuberculosis.

Dr. Clark, of Youngstown, Ohio, said that in a case recently seen, there was suspicion of Graves' disease until the symptoms of tuberculosis developed. Undoubtedly the practitioner will be benefited by realizing that these affections have much more in common than has been thought.

Dr. Dunn, of Asheville, N. C., said that in earlier life he had himself been a sufferer from exophthalmic goiter and now for many years had been engaged in the exclusive study of tuberculosis. Very naturally, then, his attention had been called to the co-existence of the two diseases whenever this occurred. He has been on the lookout for symptoms of exophthalmic goiter. Only rarely, however, has he seen the combination.

Dr. Stanton, of Philadelphia, in closing the discussion, said that his idea was to call attention to the fact that the thyroid gland was affected by tuberculosis much oftener than had been thought, and also to the possibility that latent Graves' disease might be the mistaken diagnosis for certain cases of incipient tuberculosis.

Tuberculosis of the Thoracic Duct.—Dr. Warfield T. Longcope, of Philadelphia, discussed the relationship between acute miliary tuberculosis and the occurrence of tuberculous lesions in the thoracic duct. In 25 cases of acute miliary tuberculosis that came to autopsy, 17 of them had lesions in the thoracic duct. In one of those in which there was no thoracic duct tuberculosis, there was tuberculosis of the epididymis. Others had their primary lesions elsewhere. Usually there was a large caseous nodule situated near the receptaculum chyli. Usually the lymph nodes in the neighborhood were also affected. At times there were no lesions except those of the duct, and of course it must be remembered that the tubercle bacilli may pass through the mucous membrane of the intestines without producing any serious reaction. From these cases it would seem that in most instances the beginning of the generalization is the invasion of the thoracic duct.

Vitality of Tubercle Bacilli.—Dr. David C. Twichell, of Saranac Lake, gave the results of some observations on the vitality of the tubercle bacillus in sputum when subjected to drying and sunlight and various other atmospheric conditions. When exposed to light, the bacilli gradually lose their virulence. In diffuse daylight, after seven days they cease to be virulent. On the floors of dwelling houses they were found, however, to be virulent after two and a half months. There seemed to be no difference in the vitality of the bacilli gathered in the sunlight in the middle of the room or in the dark corners. Dried bacilli still continued to be virulent for a long period. Direct sunlight may kill them in a few hours. Freezing did not seem to have any special effect on them. Moisture and darkness keeps them alive for unlimited periods. On handkerchiefs or on woolen blankets kept in dark rooms they may still be alive after many months.

Artificial Protection of Man Against Tuberculosis.—Dr. James J. Walsh, of New York, read an abstract from a paper on this subject by Dr. C. Figari, of Genoa. Dr. Figari has not succeeded in producing immunity in animals, but has succeeded in showing that the products of certain animals which have been vaccinated with attenuated cultures of the tubercle bacillus may help in protecting man against the disease. For instance, the meat and milk of animals that have been vaccinated may be used to produce a limited immunity at least that furnishes

some protection, especially to predisposed persons, against the contagiousness of tuberculosis.

Dr. Figari's paper will appear in full in a subsequent issue of the *MEDICAL NEWS*.

Vicarious Bowel Action in Tuberculosis.—Dr. Joseph Walsh, of Philadelphia, read for himself and Dr. Lawrence F. Flick, a paper in which he discussed the vicarious action of the bowel for the kidney in certain cases of incipient tuberculosis. Dr. Walsh said that in certain cases of incipient tuberculosis there is a looseness of the bowels not due to the presence of ulcers that is usually considered to be irritative and due to indiscretions of diet. Careful investigation, however, seems to show that this is really a vicarious action for the kidney. In 14 cases of long-standing tuberculosis in which there had been considerable diarrhea, the intestines were found to be normal, though the kidneys were degenerated. The diagnosis in these cases would have been enteritis. The more study there is, however, the less are serious symptoms attributed to healthy organs. In all of these cases there was acute diffuse nephritis. Usually there are tubercles in the kidney, the cortex was softer and thicker than normal and there was congestion of the pyramids. The glomeruli and the uriniferous tubules showed swelling. There was a distinct, small, round infiltration due to tuberculosis. On the other hand, there were no ulcers in the intestines and no enlargement of the mesenteric gland.

Nephritis in Tuberculosis.—Nephritis in tuberculosis would not be surprising, since it is very common to find tubercle bacilli in the urine of patients suffering from the disease. In 40 out of 60 cases of tuberculosis examined for this purpose, tubercle bacilli were found in the urine. These were not advanced cases, but often in an early stage, and many cases of tuberculosis eventually die of nephritis rather than of their pulmonary condition.

Vicarious Sweating of the Bowel.—Dr. Blumenthal, of Syracuse, N. Y., described a case of tuberculosis in which the patient had had a lesion at the left apex for five years without much advance. The character of the tuberculosis changed, however, and a distinct febrile temperature occurred every evening up to 102° F. At the same time a distinctive attack of colic with rumbling in the bowels and loose stools manifested itself. These stools were not the ordinary diarrheal stools, but properly digested material carried out in an abundance of fluid. During the day the patient had regularly formed stools. Whenever this attack did not occur, there was a severe night-sweat. The night-sweats were absent after such an attack. Shortly after the movement of the bowels, the temperature went down and the patient was much more comfortable. In this case careful examination was made at various times, but no nephritis was present. The loose stool then seemed to be a vicarious manifestation, taking the place of the sweating noticed in other patients and at other times in this patient.

Landry's Paralysis and Tuberculosis.—Dr. D. J. McCarthy, of Philadelphia, described a case in which Landry's paralysis developed in the midst of active tuberculosis and ran the usual fatal course to bulbar palsy with difficulty of swallowing and respiration in seven days. The first loss of power noted was in the arms, then followed weakness of the legs until this became complete palsy, then the shoulders were affected and some difficulty of swallowing was noted. After this there was a disap-

pointing remission followed after two days by further progress, especially in the bulb, and then the fatal termination. Not a cell in the spinal cord was in a normal healthy condition. The Klebs-Löffler bacillus, as a secondary infection, was found present in the case.

The Early Diagnosis of Tuberculosis. Committee Report to the National Association for the Prevention and Study of Tuberculosis.¹—The diagnosis of phthisis, of that well-developed stage of pulmonary tuberculosis, offers no difficulty whatever, the symptoms are well-marked and typical, the pulmonary signs easily discoverable, the expectoration contains bacilli—the clinical picture is so typical that mistakes in diagnosis cannot well be made, even by the superficially trained observer. But this stage of pathological development in the great majority of cases is reached only after very long periods, during which all signs and symptoms are less typical, less marked from that time on when infection took place. During this time, which marks the true incipency of the malady and which anatomically is characterized by the formation of few isolated tubercles in lymph glands or lung tissue, nor only vague general symptoms exist, none on which to base a positive diagnosis of the disease. Investigation has shown that such infections are of very frequent occurrence, and that only in a comparatively small percentage of these cases does the disease develop further. However, this percentage is sufficiently large to make tuberculosis the most destructive of all diseases, and the demonstration of its frequent and spontaneous arrest and of its curability by certain therapeutic measures at an early period of its development, must induce efforts of recognition long before the stage of phthisis is reached.

The discovery of the tubercle bacilli in the sputum of patients suffering from the disease constitutes a diagnostic means of indisputable accuracy. However, the consideration alone of the fact, that tubercle bacilli can appear in the sputum only after the caseation and breaking down of a tubercle situated near a bronchus, or bronchiolus, makes it certain that tuberculous changes occur previous to the appearance of the bacillus in the sputum. This is borne out also by the clinical observation of a recognisable stage of tuberculous lung involvement, before bacilli are found in the sputum and the adoption of the term "closed," designating this stage, in opposition to "open," i.e., with bacilli found in the sputum, can be recommended for a more general introduction.

From the therapeutic standpoint, the diagnosis of pulmonary tuberculosis in its closed stage is of the utmost importance, the chances of permanent recovery diminishing proportionally with the postponement of rational therapeutic measures. These measures being on the whole nothing but a radical change in the patients' mode of life, will also interfere less with the patients' usual occupations, the earlier the diagnosis is made. Hence also, for this reason, the paramount importance of an early diagnosis. The physician who declines to make a positive diagnosis of tuberculosis on account of the absence of the bacillus in the sputum only, assumes a very grave responsibility and great caution in this respect cannot be urged sufficiently. Whenever certain signs and symptoms justify a suspicion of the disease, without there being positive evidence, it is wise to

instruct the patient carefully as to his mode of life, to watch him closely and to repeat the examination at stated intervals.

As regards the examination, it may be said in general that a close and careful investigation of constitutional as well as local manifestations by the simplest methods will often reveal sufficient evidence for a positive diagnosis. The search for bacilli in the sputum has unfortunately brought about a neglect of these methods.

The history of the patient may or may not contain useful information; it ought to be carefully investigated in every case. Predisposing factors, such as cases of tuberculosis in the family and among intimates, or unhygienic mode of life, dusty and confining occupations, must all be taken in consideration, their absence in one case, on the other hand, must not discourage further examination.

The symptoms of incipient tuberculosis will rarely offer anything typical. We may have a very early hoarseness or a condition resembling that of chlorosis or neurasthenia, of bronchitis or dyspepsia. Cough may or may not be present. Hemoptysis in the absence of other causes among all the symptoms, which may be found in the history, is one of the greatest significance. Typical signs are sometimes absent for weeks after the hemoptysis. Vague as all these symptoms may be and characteristic for various morbid conditions, they assume diagnostic value only when considered together with the results of a careful physical examination.

Here inspection first of all will have to reveal conditions of stature and physical development, which in their deficiencies we know to be indicative, if not of the disease itself, at least, of a predisposition to it. Length and weight of body, circumference and degree of expansion of chest, are data of importance and in their correlation give indication of the bodily condition and state of nutrition. Still we must not depend on finding often the classical *habitus phthisicus*, the paralytic thorax, if we are to make an early diagnosis of tuberculosis. However, these data as well as the determination of symptoms are of greatest value, if for nothing else but a guidance in subsequent examinations, and for that reason should not be neglected in any case.

Of great importance is the temperature. Even a slight rise of temperature in the afternoon, if other causes can be excluded, ought to arouse invariably our suspicions. Very often this is overlooked, and to shield against such oversight, great care in the measuring of the temperature is to be recommended. Whenever possible a two-hourly record for a period of several days ought to be taken, a good thermometer to be placed in the mouth with tightly closed lips and held there for at least five minutes, the patient in a room of even temperature. It will also have to be remembered that in some tuberculous patients the rise of temperature appears only after some exercise, in women before and at the time of menstruation.

The physical examination of the chest by inspection, palpation, percussion and auscultation, if carefully and properly performed, will give more direct evidence than other methods. It may be said here that the newer methods of examination, notably that with the Roentgen rays cannot, at least in their present state of development, claim superiority over the results obtained by the above-mentioned methods.

Attention shall be called here only to a few signs

¹ Presented at the Annual Meeting, in Washington, D. C., May 18, 1905, by Drs. A. C. Klebs, J. H. Musser, F. Billings, J. C. Wilson, and H. R. M. Landis.

indicating limited lung involvement. On inspection very often a retardation in the respiratory movements over the affected lung portion can be observed, especially over one apex. This retardation is more pronounced in a more recent involvement of the corresponding area of the lung (Turban). Foci of greater extent diminish the excursions of the diaphragm of the affected side. This can be demonstrated on the fluoroscopic screen, but equally well and without apparatus by the observation of the diaphragmatic excursions by means of Litten's shadow.

The vocal fremitus in early pulmonary tuberculosis gives little information. It may be increased or decreased over areas of pleural thickening, over pleuritic exudations it is always diminished.

Painstaking percussion and auscultation of the chest, over all parts and always comparing the two sides, is of the greatest value. The use of the blue pencil for marking the border lines and determining the excursions of the lungs cannot too strongly be urged. Strong percussion, on the whole, should be avoided. Marked dullness is but rarely found over portions of the lungs in incipient tuberculosis; however, the percussion will elicit sometimes a significant retraction of one apex as compared with the other.

In judging the results of the examination by auscultation, it should always be remembered that many of the signs are subject to considerable variation, depending on the time at which the examination is made. Râles which we can easily discover in the morning will regularly be absent during the afternoon. Also on damp and rainy days we will find them when they are absent in dryer weather. Also do we find in women pulmonary signs accentuated at the time of menstruation. All these circumstances must be considered before a final judgment of the case is given.

Although every portion of the lung (including the lingula over the heart dullness) should be examined with the stethoscope, particular attention will have to be paid to the upper portions of the lungs and also to the lower borders and the axillary regions.

As the earliest auscultatory sign in early pulmonary tuberculosis can be regarded the rough and the slightly diminished respiratory murmur. The former must not be confounded with the sharp (puerile) respiratory murmur, which is more a sign of increased function than of swelling of the mucosa. Both are vesicular murmurs; the rough character is produced by a succession of sounds, following each other too rapidly for aural differentiation. Is the succession less rapid, then we speak of an interrupted respiratory murmur, which suggests much coarser changes. Thus the rough murmur changes the character of the respiratory sound, it loses its "smooth" quality and becomes "impure and roughened" (Sahli). When these adventitious sounds become audible beside the vesicular murmur, then we can speak of râles. The rough murmur is produced by slight inflammatory changes in the bronchioli, the air passing over an uneven surface and through a slightly narrowed lumen. It is principally audible during inspiration over the apices and below the clavicles. This murmur precedes the appearance of râles (not the case, as a rule, with the puerile murmur), and thus is the earliest auscultatory manifestation of tubercular involvement of the air passages. Distinct attention should be paid to it therefore. The appearance of râles over the apices (also in the axillary region) is next to it in importance. Râles indicate

catarrhal conditions; with them the intensity of the vesicular murmur is usually diminished, which is also produced by more pronounced swelling of the bronchial mucosa. In the earliest stages we hear usually fine crackling râles, they can often only be heard directly after the patient has coughed.

Bronchial respiration we hear but rarely in early tuberculosis; when it appears we have to deal with a more extensive process. By its localization in the apices and together with other signs, it is, of course, pathognomonic of consolidation; the same may also be said as regards the other deviations from the normal respiratory murmurs, which are indicative of profound tissue changes, to discuss which does not come within the scope of this report. On the other hand pleuritic friction is often heard at an early period, most frequently in or near the axillary line between the sixth and eighth ribs.

Only passing mention can be made of other diagnostic methods, of which tuberculin is the most important. Although it is well understood that by injection of small doses of tuberculin and by the febrile reaction thus produced in tuberculous individuals, we can diagnose early tuberculosis, the method necessitates great care in its application and an apparatus too complicated for general use, so that it does not lend itself to a more general introduction. The dangers of the preparation in the hands of one well acquainted with the method are very slight, but by applying carefully the other means of observation and examination, a case will rarely be found in which it would add considerably to the information gained.

The fact that certain salts, especially iodine salts, increase catarrhal symptoms and thus make them more perceptible to auscultation, has led to their administration for diagnostic purposes. For similar reasons as the above stated, a general introduction of this method cannot be recommended.

The examination with X-rays has the drawback of a complicated apparatus. Besides its value over the other methods has not yet been satisfactorily demonstrated.

Various other methods have been advocated for the early detection of tuberculosis,—inoscopy, sphygmography, sphygmomanometry, serum test, etc., all apt to increase our knowledge of the disease, but of no practical advantage in the every-day diagnosis of so frequent a disease. The careful and painstaking application of the methods well taught and well understood, with the simplest apparatus, but applied with a broad conception of the pathogenesis of the disease, will bring about much earlier diagnosis than are usually made.

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